C 21.5: 954/4

Vol. 954 Number 4

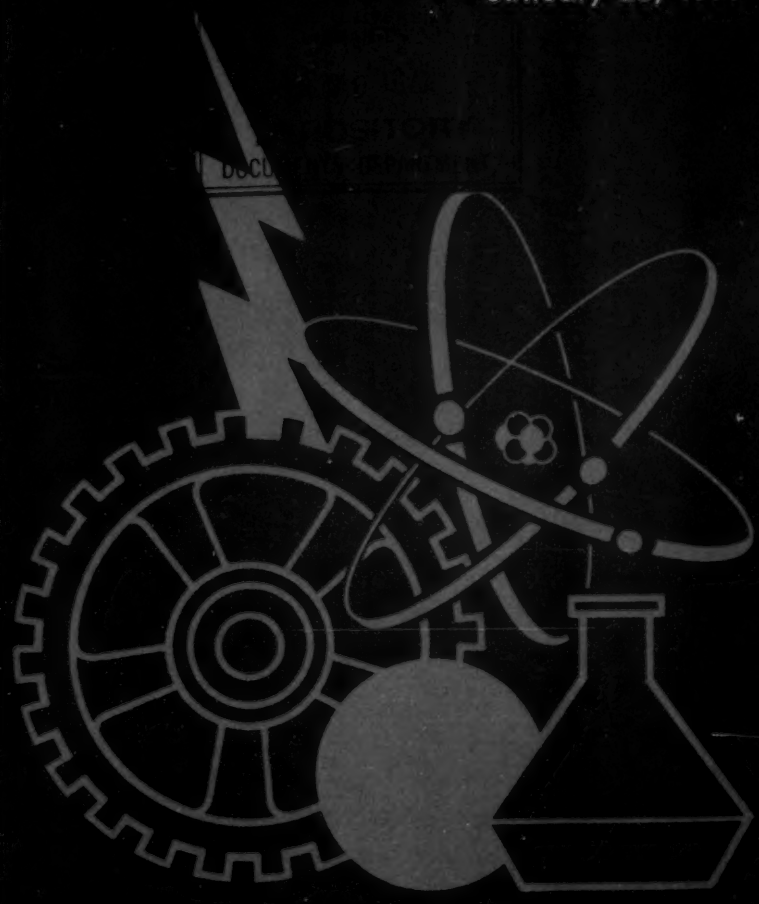
OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

January 25, 1977



PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

U.S.
DEPARTMENT
OF COMMERCE

Patent
and
Trademark
Office

OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

January 25, 1977 Volume 954 Number 4

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PATENT AND TRADEMARK OFFICE NOTICES

Practice Re: Applications Involving Computer Programs

On November 18, 1976, the Court of Customs and Patent Appeals decided the cases of *In re Noll* and *In re Chatfield*. In both cases the Board of Appeals had taken the position that the claims were drawn to non-statutory subject matter under the Supreme Court's decision in *Gottschalk* v. *Benson*, 409 U.S. 63, 175 USPQ 673 (1972). The Noll application claims were drawn to an apparatus and the Chatfield application claims were drawn to a method.

The CCPA reversed the Board of Appeals in both cases. Until these decisions become final and since further review or clarification may be forthcoming, the patent examining corps will continue to examine computer programming applications in accordance with its current interpretation of the Supreme Court decision in the Benson case.

Prosecution will be resumed on all applications previously suspended under 37 CFR 1.103(b). No further programming applications will be suspended at the instance of the Office.

C. MARSHALL DANN,
Dec. 14, 1976. *Commissioner of Patents and Trademarks.*

Administrative Instructions Under the Patent Cooperation Treaty

The purpose of this notice is to make readily accessible the most recent updated draft of the Administrative Instructions which will be established under Article 58(4) and Rule 89 of the Patent Cooperation Treaty by the Director General of the World Intellectual Property Organization. Reference to the Administrative Instructions is made in the proposed changes to Parts 1, 3 and 5 of 37 CFR that relate to the implementation of the Patent Cooperation Treaty, and which will appear in the February 8, 1977 issue of the OFFICIAL GAZETTE.

The Administrative Instructions comprise 6 parts and a number of Annexes and provide instructions on various processing requirements that are not covered in detail by the Treaty or Regulations. These Administrative Instructions were drafted by the World Intellectual Property Organization of Geneva, Switzerland, which will act as the Secretariat for the International Patent Cooperation Union. The most recent fourth revised draft, document PCT/AAQ/VII/6, is dated August 16, 1976. This draft has been updated by the Patent and Trademark Office to reflect the decisions taken at the meeting of the Interim Advisory Committee for Administrative Questions held on November 1 to 8, 1976 as reflected in the final report of that session (document PCT/AAQ/VII/19). This draft is subject to further revision before promulgation.

RENE D. TEGTMEYER,
Assistant Commissioner for Patents.

ADMINISTRATIVE INSTRUCTIONS UNDER THE PATENT COOPERATION TREATY

INTRODUCTION

Provisions of the PCT Relating to the Administrative Instructions

1. Article 58(4) of the Patent Cooperation Treaty (PCT) stipulates that: "The Regulations provide for the establishment, under the control of the Assembly, of Administrative Instructions by the Director General."

2. Rule 89 of the Regulations under the PCT, which is entitled "Administrative Instructions," reads as follows:

"89.1 *Scope*

(a) The Administrative Instructions shall contain provisions:

(i) concerning matters in respect of which these Regulations expressly refer to such Instructions;

(ii) concerning any details in respect of the application of these Regulations.

(b) The Administrative Instructions shall not be in conflict with the provisions of the Treaty, these Regulations, or any agreement concluded by the International Bureau with an International Searching Authority, or an International Preliminary Examining Authority.

"89.2 *Source*

(a) The Administrative Instructions shall be drawn up and promulgated by the Director General after consultation with the receiving Offices and the International Searching and Preliminary Examining Authorities.

(b) They may be modified by the Director General after consultation with the Offices or Authorities which have a direct interest in the proposed modification.

(c) The Assembly may invite the Director General to modify the Administrative Instructions, and the Director General shall proceed accordingly.

"89.3 *Publication and Entry Into Force*

(a) The Administrative Instructions and any modification thereof shall be published in the Gazette.

(b) Each publication shall specify the date on which the published provisions come into effect. The dates may be different for different provisions, provided that no provision may be declared effective prior to its publication in the Gazette."

Background to This Document

3. The first draft of the Administrative Instructions under the PCT was submitted to the PCT Interim Advisory Committee for Administrative Questions (hereinafter referred to as "the Interim Committee") at its third session in October 1972. Revised drafts were submitted to the subsequent sessions of the Interim Committee held in October 1973, in November 1974, in November 1975, and in November 1976.

4. Each revision incorporated the changes agreed on or requested by the Interim Committee in the previous session.

Contents of This Document

5. This document contains the fourth revised draft of the Administrative Instructions. It incorporates those amendments upon which agreement was reached at the seventh session of the Interim Committee, as well as some proposals resulting from further study and examination by the International Bureau of questions it was asked to study by the Interim Committee.

6. In order to facilitate the practical implementation of the PCT, the Administrative Instructions will be supplemented by Forms for use by the various PCT Authorities in effecting the required communications which arise in the course of procedures under the PCT. The drafts of such Forms, as revised on the basis of the comments received from the September 1974 session of the Working Group on Forms established by the Interim Committee, were submitted to the Interim Committee at its sixth session. The forms, as further revised in the light of comments made at the said sixth session or as a result of the simulated test program of PCT procedures, are contained in separate working documents.

7. Sections marked by a triple asterisk (***) are those amended by the United States Patent and Trademark Office to reflect decisions reached at the November 1–8, 1976 meeting of the PCT Interim Advisory Committee for Administrative Questions by which this draft document was considered. The final wording of these asterisked sections, as well as of the entire document will be determined by the Director General of the World Intellectual Property Organisation.

ADMINISTRATIVE INSTRUCTIONS

(FOURTH REVISED DRAFT)

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ANNEX G: Forms**

*This annex was deleted in view of an amendment to Section 406. Matters concerning publication will be discussed at a meeting of the Working Group on Publication and Drawings, Feb. 21–25, 1977.

**Except for the Request form (PCT/RO/101) and International Search Report form (PCT/ISA/210), only a listing of the forms has been included in this publication, as in many respects the content and format of the forms has not been finalized.

PART 1—INSTRUCTIONS RELATING TO GENERAL MATTERS

SECTION 101

Abbreviated Expressions

In these Administrative Instructions:

(i) "Treaty" means the Patent Cooperation Treaty;

(ii) "Regulations" means the Regulations under the Treaty;

(iii) "Article" means an Article of the Treaty;

(iv) "Rule" means a Rule of the Regulations;

(v) "International Bureau" means the International Bureau as defined in Article 2(xix) of the Treaty;

(vi) "International Authorities" means the receiving Offices, the International Searching Authorities, the International Preliminary Examining Authorities, and the International Bureau.

SECTION 102 ***

Use of the Forms

(a) The Forms annexed to these Administrative Instructions as *Annex G* (hereinafter referred to as "the Forms") are part of these Administrative Instructions.

(b) Except for slight differences in layout necessary in view of the printing of the forms in various languages, the content, format and use of the following four printed forms are obligatory:

PCT/RO/101—Request;
PCT/ISA/210—International Search Report;
PCT/IPEA/401—Demand;
PCT/IPEA/409—International Preliminary Examination Report.

(c) Except for slight differences in layout necessary in view of the printing of the forms in various languages and in view of processing needs of various offices, the content, layout and use of the following forms are obligatory when such forms are exchanged with the applicant and other International Authorities not part of the same office:

PCT/RO/103	PCT/ISA/201	PCT/IPEA/405
PCT/RO/104	PCT/ISA/202	PCT/IPEA/407
PCT/RO/106	PCT/ISA/203	PCT/IPEA/408
PCT/RO/111	PCT/ISA/205	PCT/IPEA/410
PCT/RO/112	PCT/ISA/206	PCT/IPEA/412
PCT/RO/113	PCT/ISA/209	PCT/IPEA/415
PCT/RO/114	PCT/ISA/212	PCT/IPEA/418
PCT/RO/115	PCT/ISA/214	PCT/IPEA/419
PCT/RO/116	PCT/ISA/215	PCT/IPEA/420
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PCT/RO/130		

PCT/IB/301–327 and PCT/IB/329–345

(d) The notes to all forms are optional as to content, format and use.

SECTION 103***

Languages of the Forms

(a) The language of the forms to be used by any receiving Office shall be the same as the language in which the international application is filed, provided that the receiving Office may, in its communications to the applicant, use any other language being one of its official languages.

(b) The language or languages of the Forms to be used by any International Searching Authority shall be specified in the applicable agreement referred to in Article 16(3)(b).

(c) The language or languages of the Forms to be used by any International Preliminary Examining Authority shall be specified in the applicable agreement referred to in Article 32(3).

(d) The language of any Form used by the International Bureau shall be English where the language of the international application is English, and it shall be French where the language of the international application is French. Where the language of the international application is neither English nor French, the language or any Form used by the International Bureau in its communications to any other International Authority shall be English or French according to the wishes of such Authority, and in its communications to the applicant it shall be English or French according to the wishes of the applicant.

SECTION 104

Language of Correspondence From the Applicant

(a) The language of any letter from the applicant to the receiving Office shall be the same as the language of the international application to which such letter relates. However, the receiving Office may expressly authorize the use of any other language.

(b) The language of any letter from the applicant to the International Bureau shall be English where the language of the international application is English, and it shall be French where the language of the international application is French. Where the language of the international application is neither English nor French, the language of any letter from the applicant to the International Bureau shall be English or French at the choice of the applicant.

SECTION 105

Several Applicants

Where any international application indicates as applicants several persons, it shall be sufficient, for the purpose of identifying that application, to indicate, in any Form or correspondence relating to such application, the name of the applicant first named in the request.

SECTION 106

Common Agent for Several Applicants

In the case of several applicants, any agent designated under Rule 4.7 in the request signed by all the applicants, or appointed under Rule 90.3 in a separate power of attorney signed by all the applicants, shall be considered a common agent.

SECTION 107

Identification of International Authorities

(a) Whenever the nature of any communication from or to the applicant or from or to any International Authority so permits, any International Authority may be indicated in the communicaion by the two-letter code as appearing in *Annex B*.

(b) Where the International Authority is a receiving Office, an International Searching Authority or an International Preliminary Examining Authority, indication thereof shall be preceded by the letters "RO", "ISA", or "IPEA", respectively, followed by a slant (e.g., "RO/JA", "ISA/US", "IPEA/SU").

SECTION 108***

Correspondence Intended for the Applicant

(a) Any correspondence from an International Authority intended for the applicant, or, in the case of several applicants, the applicants, shall be addressed as follows:

(i) Where the applicant has designated or appointed one agent, correspondence shall be addressed to that agent. Where, in the case of several applicants, the applicants are represented by a common representative or a common agent, correspondence shall be addressed to that representative or that agent.

(ii) Where the applicant has designated several agents in the request, correspondence shall be addressed to the agent first mentioned therein. Where, in the case of several applicants,

the applicants have designated several common agents in the request, correspondence shall be addressed to the common agent first mentioned therein.

(iii) Where the applicant has appointed several agents in one or more separate powers of attorney, correspondence shall be addressed to the agent first mentioned in the earliest filed and still valid separate power of attorney. Where, in the case of several applicants, the applicants have appointed several common agents in one or more separate powers of attorney, correspondence shall be addressed to the common agent first mentioned in the earliest filed and still valid separate power of attorney.

(b) Any correspondence from an International Authority to the applicant or his agent shall be marked with the file reference of the applicant or agent, if such identifying file reference has been indicated in the Request, provided it does not exceed ten characters.

SECTION 109

Notification of Authorization or Refusal of Rectification

Any International Authority which authorizes or refuses rectification of obvious errors of transcription under Rule 91 shall promptly inform the applicant of such authorization or refusal and, in the case of refusal, of the reasons therefor.

PART 2—INSTRUCTIONS RELATING TO THE INTERNATIONAL APPLICATION

SECTION 201***

*Dates**

Alternative A [ICIREPAT Standard]

Any date in the international application or used in any correspondence relating to the international application, shall be indicated by the Arabic number of the day, by the name of the month, and by the Arabic number of the year. The receiving Office, or the International Bureau where the receiving Office fails to do so, shall, after or below any date indicated by the applicant in the request, repeat the date, in parenthesis, by indicating it by two-digit Arabic numerals each for the number of the day, for the number of the month and for the last two numbers of the year, in that order and with a period after the digit pairs of the day and of the month (for example, "30 March 1972 (30.03.72)").

Alternative B [ISO Standard]

Any date in the international application or used in any correspondence relating to the international application, shall be indicated by the Arabic number of the year, by the name of the month, and by the Arabic number of the day. The receiving Office, or the International Bureau where the receiving Office fails to do so, shall, after or below any date indicated by the applicant in the request, repeat the date, in parenthesis, by indicating it by four-digit Arabic numerals for the number of the year and two-digit Arabic numerals each for the number of the month and for the number of the day, in that order and with a hyphen or a space before the digit pairs of the month and of the day (for example, "1972 March 30 (1972-03-30)" or "1972 March 30 (1972 03 30)").

SECTION 202***

Names of States: Cancellation of Designations

(a) The name of any State referred to in the request shall be indicated either by the full name of the State or by a generally accepted short title which, if the indications are in English or French, shall be as appearing in *Annex A*. The receiving Office, or the International Bureau where the receiving Office fails to do so, shall insert, in the appropriate space provided for in the request form, the two-letter country code as appearing in *Annex B* (for example, where France is the third designated State in Box V or the request form, "FR 3. France" or "FR 3. French Republic").

(b) The receiving Office shall cancel *ex-officio* the designation of States other than Contracting States, and inform the applicant promptly of such action.

SECTION 203***

Kind of Protection

(a) Where the applicant wishes his application to be treated in any designated State as an application not for a patent but for the grant of another kind of protection referred to in Article 43, he shall make the indication in the request referred to in Rule 4.12(a) by inserting the words "inventor's certificate," "utility certificate," "utility model," "patent of addition," "certificate of addition," "inventor's certificate of addition" or "utility certificate of addition," or their equivalent in the language of the international application, immediately after the indication of the said State.

(b) Where the applicant is seeking two kinds of protection under Article 44, he shall make the indication in the request referred to in Rule 4.12(b) by inserting, immediately after the indication of the said State and in the language of the international application either:

(i) any two of the following terms connected by the word "and": "patent," "inventor's certificate," "utility certificate," "utility model," "patent of addition," "certificate of addition," "inventor's certificate of addition," "utility certificate of addition;" or

(ii) any two of the terms indicated in (i), above, one of them preceded by the word "primarily" and the other by the word "subsidiarily."

SECTION 204***

Regional Patents

Where the applicant wishes to obtain a regional patent in respect to any designated State, he shall make the indication in the request referred to in Rule 4.1(b)(iv) by inserting the words "regional patent," or their equivalent in the language of the international application, immediately after the indication of the said State or, where an indication has been made under Section 203, after that indication provided that:

(i) where Article 4(1)(ii), third clause applies, and not all the States party to the regional treaty have been designated, the international application shall be treated as if all those States had been designated and as if the designations of all such States contained the said words, whether the said designations contained an indication of the wish to obtain a regional patent or, according to Article 4(1)(ii), fourth clause, are to be treated as containing such indication;

(ii) where the national law of any designated State contains a provision as referred to in Article 45(2), the International Bureau shall, according to Article 4(1)(ii), fourth clause, treat the designation as if it contained the said words even where the applicant failed to indicate them.

SECTION 205

Headings of the Parts of the Description

The headings referred to in Rule 5.1(c) should be as follows:

(i) for matter referred to in Rule 5.1(a)(i), "Technical Field";

(ii) for matter referred to in Rule 5.1(a)(ii), "Background Art";

(iii) for matter referred to in Rule 5.1(a)(iii), "Disclosure of Invention";

(iv) for mattter referred to in Rule 5.1(a)(iv), "Brief Description of Drawings";

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*Alternative A is based on ICIREPAT standards whereas Alternative B is based on ISO standards. The sequence of the latter is the reverse of the former. The solution eventually adopted should follow the practice which will prevail in the industrial property field at the time the Administrative Instructions will be promulgated.

(v) for matter referred to in Rule 5.1(a)(v), "Best Mode for Carrying out the Invention";

(vi) for matter referred to in Rule 5.1(a)(vi), "Industrial Applicability".

SECTION 206

Numbering of Claims Upon Amendment

(a) Any claim submitted after the filing date of the international application and which is not identical with the claims previously appearing in the international application shall, at the choice of the applicant, be submitted either:

(i) as an amended claim, in which case, it shall bear the same number as the previous claim it amends; that number shall be followed by the word "(amended)" or its equivalent in the language of the international application; or

(ii) as a new claim, in which case, it shall bear the next number after the highest previously numbered claim; that number shall be followed by the word "(new)" or its equivalent in the language of the international application.

(b) The deletion of any claim previously appearing in the international application shall be made by indicating the number of the previous claim followed by the word "(cancelled)" or its equivalent in the language of the international application.

SECTION 207

Common Representative Designated in the Request

If the applicants designate a common representative in accordance with Rule 4.8(a), such common representative shall be indicated on the front page of the request form. The indication of the common representative shall take the form of a statement designating the named applicant to act as the common representative on behalf of all the applicants.

SECTION 208***

Arrangement of Elements and Numbering of Sheets of the International Application

(a) In effecting the sequential numbering of the sheets of the international application in accordance with Rule 11.7, the elements of the international application shall be placed in the following order: the request, the description, the claims, the abstract, the drawings.

(b) The sequential numbering shall be effected by using three separate series of numbering, one applying to the request only and commencing with the first sheet of the request, the second commencing with the first sheet of the description and continuing through the last sheet of the abstract and the third applying to the drawings only.

PART 3—INSTRUCTIONS RELATING TO THE RECEIVING OFFICE

SECTION 301

Notification of Receipt of Purported International Application

Any receiving Office may notify the applicant of the receipt of the purported international application. The notification should indicate the date of actual receipt, the provisional file number of the purported international application referred to in Section 307(a) and the applicant's file number, if available, as well as, where useful for purposes of identification, the title of the invention.

SECTION 302

Notification of Priority Claim Considered Not to Have Been Made

Where, owing to failure to meet the requirements of Rule 4.10(b), the priority claim is, for the purposes of procedure, under the Treaty, considered not to have been made, the receiving Office shall indicate that fact in the international application by marking over the box in the request form which provides for the information concerning the priority claim, the words "NOT TO BE CONSIDERED FOR PCT PROCEDURE" or its equivalent in the language of the international application. The receiving Office shall notify the applicant accordingly. If copies of the international application have already been sent to the International Bureau and the International Searching Authority, the receiving Office shall also notify that Bureau and that Authority.

SECTION 303

Deletion of Additional Matter in the Request

Where, under Rule 4.17(b), the receiving Office deletes ex officio any matter contained in the request, it shall do so by placing such matter between square brackets and entering the word "DELETED," or its equivalent in the language of the international application, in the right-hand margin adjacent to the matter so placed between brackets, and shall notify the applican. accordingly. If copies of the international application have already been sent to the International Bureau and the International Searching Authority, the receiving Office shall also notify that Bureau and that Authority.

SECTION 304

Corrections Submitted to the Receiving Office Concerning Expressions, Etc., Not to be Used in the International Application

Where the applicant submits corrections to the receiving Office aimed at complying with the prescriptions of Rule 9.1, that Office shall, if copies of the international application have not yet been transmitted to the International Bureau and the International Searching Authority, attach copies of such corrections to the international application. If copies of the international application have already been transmitted, the receiving Office shall transmit copies of such corrections to the said Bureau and the said Authority.

SECTION 305

Identifying the Copies of the International Application

(a) Where, under Rule 11.1(a), the international application has been filed in one copy, the receiving Office shall, after preparing under Rule 21.1(a) the additional copies required under Article 12(1), mark:

(i) the words "RECORD COPY" in the upper left-hand corner of the first page of the original copy,

(ii) in the same space on one additional copy, the words "SEARCH COPY," and

(iii) in the same space on the other such copy, the words "HOME COPY," or their equivalent in the language of the international application.

(b) Where, under Rule 11.1(b), the international application has been filed in more than one copy, the receiving Office shall choose the copy most suitable for reproduction purposes, and mark the words "RECORD COPY," in the upper left-hand corner of its first page. After verifying the identity of any additional copies and, if applicable, preparing under Rule 21.1(b) the home copy, it shall mark, in the upper left-hand corner of the first page of one such copy, the words "SEARCH COPY" and, in the same space on the other such copy, the words "HOME COPY," or their equivalent in the language of the international application.

SECTION 306

Change in the Person, Name or Address of the Applicant

Any request for the recording of any changes in the person or name of the applicant referred to in Rule 18.5 or Rule 54.4, or of any change in the address of the applicant shall be signed by the applicant or, if the receiving Office requested such change under Rule 18.5 or Rule 54.4, by the receiving Office. The request shall indicate the name or address of the applicant for which the change is requested.

SECTION 307***

System of Numbering International Applications

(a) The provisional file number to be marked on papers purporting to be an international application under Rule 20.1 shall consist of the letters "PCT" followed by a slant, a

two-letter code, as in *Annex B*, indicating the receiving Office, a two-digit indication of the last two numbers of the year in which such papers were first received, a slant, and a five-digit number allotted in sequential order corresponding to the order in which the international applications are received (e.g., PCT/SU76/00001).

(b) The International application number shall be the provisional file number referred to in paragraph (a), except that, if a purported international application fails to receive a filing date under Article 11, the indication "PCT/" in the provisional international application number shall be deleted by the receiving Office by drawing a line therethrough.

SECTION 308

Marking of the Sheets of the International Application

(a) The receiving Office shall indelibly mark, so as to admit of direct reproduction in any of the manners set forth in Rule 11.2(a), the provisional file number referred to in Section 307(a) in the upper right-hand corner of each sheet of each copy of the purported international application.

(b) The data to be indicated on any replacement sheet under Rule 26.4(b) shall be indelibly marked by the receiving Office, so as to admit of direct reproduction in any of the manners set forth in Rule 11.2(a), in the upper right-hand corner of each replacement sheet.

SECTION 309

Procedure in the Case of Later Submitted Sheets

(a) The receiving Office shall indelibly mark, so as to admit of direct reproduction in any of the manners set forth in Rule 11.2(a), any sheet received on a date later than the date on which sheets were first received with the date on which it received that sheet, inserted immeditely below the provisional file number referred to in Section 307(a), or the international application number referred to in Section 307(b), as the case may be.

(b) The receiving Office shall, in the case of later submitted sheets received within the time limits referred to in Rule 20.2(a)(i) and (ii),

(i) effect the required correction of the international filing date, or, where no international filing date has yet been accorded, of the date of receipt of the purported international application;

(ii) notify the applicant of the correction effected under item (i), above;

(iii) where transmittals under Article 12(1) have already been made, notify the International Bureau and the International Searching Authority of any correction effected under item (i), above, by transmitting a copy of the corrected first page of the request, and forward copies of the later submitted sheets to the said Bureau and the said Authority;

(iv) where transmittals under Article 12(1) have not yet been made, attach a copy of the later submitted sheets to the record copy and the search copy.

(c) The receiving Office shall, in the case of later submitted sheets received after the expiration of the time limits referred to in Rule 20.2(a)(i) and (ii):

(i) notify the applicant of that fact and of the date of receipt of the later submitted sheets;

(ii) where transmittals under Article 12(1) have already been made, forward a copy of the later submitted sheets to the International Bureau with the indication that such sheets are not to be taken into consideration for the purposes of international processing;

(iii) where transmittals under Article 12(1) have not yet been made, attach a copy of the later submitted sheets to the record copy with the indication that such sheets are not to be taken into consideration for the purposes of international processing.

SECTION 310

Procedure in the Case of Missing Drawings

(a) Where the international application refers to drawings which in fact are not included in that application, the receiving Office shall make the indication referred to in Rule 26.6(a) by an appropriate marking of the request form.

(b) Section 309(a) shall apply also in the case of drawings received by the receiving Office on a date later than the date on which sheets were first received by that Office.

(c) The receiving Office shall, in the case of missing drawings received within the time limit referred to in Rule 20.2(a)(ii),

(i) effect the required correction of the international filing date, or, where no international filing date has yet been accorded, of the date of receipt of the purported international application, and delete the indication made under paragraph (a) above;

(ii) notify the applicant of the correction effected under item (i), above;

(iii) where transmittals under Article 12(1) have already been made, notify the International Bureau and the International Searching Authority of any correction effected under item (i), above, by transmitting a copy of the corrected first page of the request, and forward copies of the later submitted drawings to the said Bureau and the said Authority;

(iv) where transmittals under Article 12(1) have not yet been made, attach a copy of the later submitted drawings to the record copy and the search copy.

(d) The receiving Office shall, in the case of missing drawings received after the expiration of the time limit referred to in Rule 20.2(a)(iii):

(i) notify the applicant of the fact and of the date of receipt of the later submitted drawings;

(ii) where transmittals under Article 12(1) have already been made, forward a copy of the later submitted drawings to the International Bureau with the indication that such drawings and any reference to such drawings are not to be taken into consideration for the purposes of international processing;

(iii) where transmittals under Article 12(1) have not yet been made, attach a copy of the later submitted drawings to the record copy with the indication that such drawings and any reference to such drawings are not to be taken into consideration for the purposes of international processing.

SECTION 311***

Renumbering of Sheets of the International Application

(a) The receiving Office shall, subject to Section 208, sequentially renumber the sheets of the international application when necessitated by the addition of any new sheet, the deletion of entire sheets, a change in the order of the sheets or any other reason.

(b) The sheets of the international application shall be provisionally renumbered in the following manner:

(i) when a sheet is deleted, the receiving Office shall either include a blank sheet with the same number and with the word "deleted," or its equivalent in the language of the international application, below the number, or insert, in brackets, below the number of the following sheet, the number of the deleted sheet with the word "deleted" or its equivalent in the language of the international application;

(ii) when a sheet is substituted, the receiving Office shall write below the number of the new sheet the word "substitute" or its equivalent in the language of the international application;

(iii) when one or more sheets are added, each sheet shall be identified by the number of the preceding sheet followed by an oblique stroke and then by a natural number series, starting always with number one for the first sheet added after an unchanged sheet. The last added sheet shall be marked "last" beside the page number (e.g., 10/1 last; 15/1, 15/1/1, 15/1/2 last).

(c) In the cases mentioned in (i) and (iii) above, it is recommended that the receiving Office should write, below the number of the last sheet, the total number of the sheets of the international application followed by the words "TOTAL OF SHEETS" or their equivalent in the language of the international application.

SECTION 312

Notification of Decision Not To Issue Declaration that the International Application is Considered Withdrawn

Where the receiving Office, after having notified the applicant under Rule 29.4 of its intent to issue a declaration under Article 14(4), decides not to issue such a Declaration, it shall notify the applicant accordingly.

SECTION 313

Manner of Making the Necessary Annotations in the Check List

Where, under Rule 3.3(b), the receiving Office itself fills in the check list, that Office shall mark, next to such check list, the words "FILLED IN BY RO," or their equivalent in the language of the international application. Where only some of the indications are filled in by the receiving Office, the said words and each indication filled in by that Office shall be identified by an asterisk.

SECTION 314

Manner of Indicating Correction of the Priority Date or Cancellation of the Priority Claim

(a) Where, under Rule 4.10(d), the applicant corrects the erroneously indicated filing date of any earlier application, the receiving Office shall enter the corrected date in the request and draw a line through the previously entered date while still leaving it legible.

(b) Where, under Rule 4.10(d), the receiving Office cancels the declaration made under Article 8(1), that Office shall mark over the said declaration the words "CANCELLED ON REQUEST OF APPLICANT" or "CANCELLED EX OFFICIO BY RO," or their equivalent in the language of the international application, as the case may be.

SECTION 315

Notification of Non-Collection of Record Copy

Where, under Rule 22.2(d), the receiving Office has, in accordance with the applicant's wish, held the record copy at the disposal of the applicant, and the applicant has not collected that copy by the expiration of the time limit for receipt of that copy by the International Bureau, the receiving Office shall notify the applicant accordingly.

SECTION 316

Procedure in the Case Where the International Application Lacks the Prescribed Signature

Where, under Article 14(1)(a)(i), the receiving Office finds that any international application is defective in that it lacks the prescribed signature, that Office shall send to the applicant, together with the invitation to correct under Article 14(1)(b), a copy of the request part of the international application. The applicant shall, within the prescribed time limit, return said copy after affixing thereto the prescribed signature.

PART 4—INSTRUCTIONS RELATING TO THE INTERNATIONAL BUREAU

SECTION 401

Marking of Sheets of the Record Copy

The International Bureau shall, under Rule 24.1, mark the date of receipt of the record copy in the appropriate space on the request form and place the stamp of the International Bureau in the lower right-hand corner of each sheet of the record copy.

SECTION 402

Notification of Correction of the Priority Date or Cancellation of the Priority Claim

Where, under Rule 4.10(d), the correction of the priority date or the cancellation of the priority claim is effected by the International Bureau, the manner of indicating the correction or cancellation set forth in Section 314 shall apply *mutatis mutandis*. The receiving Office, in addition to the applicant and the International Searching Authority, shall be notified accordingly by the International Bureau.

SECTION 403

Transmittal of Protest Against Payment of Additional Fee and Decision Thereon

Where, under Rule 40.2(c) or 68.3(c), the International Bureau receives a request from the applicant to forward to any designated or elected Office the texts of both the protest against payment of an additional fee and the decision thereon by the International Searching Authority or the International Preliminary Examining Authority, as the case may be, it shall proceed according to such request.

SECTION 404

International Publication Number

The International Bureau shall assign to each published international application an international publication number which shall be different from the international application number. The international publication number shall be used on the pamphlet and in the Gazette entry. It shall consist of the two-letter code "WO" followed by a two-digit designation of the last two numbers of the year of publication, a slant, and a serial number consisting of five digits (e.g., WO75/12375").

SECTION 405

Special Publication Fee

(a) The special publication fee provided for in Rule 48.4 shall be _____ Swiss francs.

SECTION 406***

Pamphlets

(a) Pamphlets referred to in Rule 48.1 shall be published on a given day of each week.

(b) All pamphlets shall be of A4 size and shall be printed by offset, recto-verso.

(c) The form and particulars of the front page of the pamphlet shall be decided by the Director General.

SECTION 407

The Gazette

(a) The Gazette referred to in Rule 86 shall be of A4 size and shall be printed by offset, recto-verso.

(b) In addition to the contents specified in Rule 86, the Gazette shall contain, in respect of each published international application, the data indicated in *Annex E*.

(c) The information referred to in Rule 86.1(v) shall be that which is indicated in *Annex F*.

(d) The subscription price of the Gazette shall be _____ Swiss francs per year. The price of any single issue of the Gazette shall be _____ Swiss francs.

SECTION 408

Priority Application Number

(a) If the application number of the earlier application referred to in Rule 4.10(c) (priority application number) is furnished to the International Bureau within the prescribed time limit, that Bureau shall enter the said number in the space provided therefor in the request form.

(b) If the priority application number is furnished after the expiration of the prescribed time limit, the Internatonal Bureau shall indicate, in the international publicaton, the date on which the said number was furnished, by including on the front page of the pamphlet next to the priority application number the words "FURNISHED LATE ON . . . . (date)," and their equivalent in the language of the international application, provided that language is French, German, Japanese or Russian.

(c) If the priority application number has not been furnished at the time of the international publication, the International Bureau shall indicate that fact by including on the front page of the pamphlet in the space provided for the priority application number the words "NOT FURNISHED AT TIME OF THIS PUBLICATION," and their equivalent in the language of the international application, provided that language is French, German, Japanese or Russian.

SECTION 409

Notification of Priority Claim Considered Not to Have Been Made

Where the International Bureau notes that the receiving Office has failed to notify the applicant as provided in Section 302, it shall send a notification to the same effect to the applicant, the receiving Office and the International Searching Authority.

SECTION 410

Numbering of Sheets of the International Application for Purposes of International Publication

In the course of preparing the international application for international publication, the International Bureau shall sequentially renumber the sheets of the international application only when necessitated by the addition of any new sheet, the deletion of entire sheets or a change in the order of the sheets. Otherwise, the numbering provided under Section 208 shall be maintained.

SECTION 411

Notification That the Certified Copy of the Priority Document Has Not Been Submitted

Where the time limit under Rule 17.1(a) has expired and the International Bureau has not received a certified copy of the priority document, it shall notify the applicant and the designated Offices accordingly.

PART 5—INSTRUCTIONS RELATING TO THE INTERNATIONAL SEARCHING AUTHORITY

SECTION 501

Corrections Submitted to the International Searching Authority Concerning Expressions, etc., Not To Be Used in the International Application

Where the applicant submits corrections to the International Searching Authority aimed at complying the prescription of Rule 9.1, that Authority shall transmit copies of such corrections to the receiving Office and the International Bureau.

SECTION 502

Protest Against Payment of Additional Fee and Decision Thereon

The International Searching Authority shall transmit to the applicant, at the latest, together with the International search report, any decision which it has taken under Rule 40.2(c) on the protest of the applicant against the payment of the additional fee. At the same time, it shall transmit to the International Bureau a copy of both the protest and the decision thereon, as well as any request by the applicant to forward the texts of both the protest and the decision thereon to any of the designated Offices.

SECTION 503 ***

*Method of Identifying Documents Cited in the International Search Report**

Identification of any document cited in the international search report referred to in Rule 43.5(b) shall be made by indicating the following elements in the order in which they are listed:

(a) *In the case of any patent document* (patent documents being patents within the meaning of Article 2(ii) as well as published applications relating thereto):

(i) the Office that issued the document, by the two-letter code as in *Annex B*,

(ii) the kind of document, by the appropriate symbols as in *Annex C*,

(iii) the number of the document as given to it by the Office that issued it (for Japanese patent documents the indication of the year of the reign of the Emperor must precede the serial number of the patent document),

(iv) the name of the patentee or applicant

(v) the date of publication of the cited patent document as indicated thereon; and

(vi) where applicable, the pages, columns or lines where the relevant passages appear, or the relevant figures of the drawings.

(The following example illustrates the citation of a patent document according to paragraph (a) above: JA, B, 5014535, Kanagawa, published 1975, April 8, see column 2 lines 10 to 25.)

(b) *In the case of any book or other separately issued publication:*

(i) the name of the author;

(ii) the title (including, where applicable, the number of the edition and/or volume);

(iii) the year of publication (when this coincides with the year of the international application or of the priority claim, the International Searching Authority shall endeavour to determine the month and, if necessary, the day of publication and to indicate these data in the international search report);

(iv) the name of the publisher;

(v) as far as available, the place of publication (where only the location of the publiser appears on the book or other separately issued publication, then that location shall be indicated as the place of publication); and

(vi) where applicable, the pages, columns or lines where the relevant passages appear, or the relevant figures of the drawings.

(The following example illustrates the citation of a book or other separately issued publication according to paragraph (b) above: H. Walton, 'Microwave Quantum Theory', Volume 2, published 1973, by Sweet and Maxwell (London), see pages 138 to 192, especially pages 184–188.)

(c) *In the case of any article published in a periodical or other serial publication:*

(i) the title of the periodical or other serial publication;

(ii) the number of the volume and the date of the issue in which the article appears;

(iii) as far as available, the place of publication (where only the location of the publisher appears in the periodical or other serial publication, then that location shall be indicated as the place of publication);

(iv) the author and the title of the article and the number of the page both on which the article starts and ends; and

(v) where applicable, the pages, columns or lines where the relevant passages appear, or the relevant figures of the drawings.

(The following example illustrates the citation of an article published in a periodical or other serial publication according to paragraph (c) above: IBM Technical Disclosure Bulletin, Volume 17, no. 5, issued 1974 October (Armonk, New York), J. G. Drop, 'Integrated Circuit Personalization at the Module Level', see pages 1344 to 1345.)

(d) *In the case of abstracts:*

(i) the identification of the document containing the abstract in the manner set forth in paragraphs (a), (b) and (c), respectively, depending upon whether the abstract is contained in a patent document, in a book or other separately issued publication, or in an article published in a periodical or other serial publication;

(ii) in the case where the abstract is not published together with the full text document which served as its basis, the identification of both abstract and full text document on the basis of whatever bibliographic data may be available in respect thereto.

(The following example illustrates the citation of an abstract according to paragraph (d)(ii) above: Chemical Abstracts, Volume 75, no. 20, issued 1971, November 15 (Columbus, Ohio, U.S.A.). D.I. Shetulov, 'Surface Effects During Metal Fatigue', see page 163, column 1, the abstract no. 120718k, Fiz.-Khim. Mekh. Mater. 1971, 7(2), 7–11 (Russ).)

SECTION 504

Classification of the Subject Matter of the International Application

(a) Where the subject matter of the international application is such that classification thereof requires more than one classification symbol according to the principles to be followed in the application of the International Patent Classification to any given patent document, the international search report shall indicate all such symbols.

(b) Where any national classification system is used, the international search report may indicate all the applicable classification symbols also according to that system.

(c) Where the subject matter of the international application is classified both according to the International Patent Classification and to any national classification system, the international search report shall, wherever possible, indicate the corresponding symbols of both classifications opposite each other.

SECTION 505

Indication of Citations of Particular Relevance in the International Search Report

Where any document cited in the international search report is of particular relevance, the special indication required by Rule 43.5(c) shall consist of the letter "X" placed next to the citation of the said document.

SECTION 506

Comments on Draft Translation of the International Application

(a) Where the applicant has made comments, within the time limits fixed by the International Searching Authority, on the draft translation referred to in Rule 48.3(b), that Authority shall notify the applicant whether it has changed the draft translation and, if so, of the changes it has made therein.

(b) Where the applicant submits comments on the draft translation after the expiration of the time limit fixed by the International Searching Authority, and that Authority changes the draft translation, it shall notify the applicant accordingly.

SECTION 507*** (Deleted)

SECTION 508***

Manner of Indicating Certain Special Categories of Documents Cited in the International Search Report

(a) Where any document cited in the international search report refers to an oral disclosure, use, exhibition, or other means referred to in Rule 33.1(b), the separate indication required by that Rule shall consist of the letter "O" placed next to the citation of the said document.

(b) Where any document cited in the international search report is a published application or patent as defined in Rule 33.1(c), the special mention required by that Rule shall consist of the letter "E" placed next to the citation of the said document.

(c) Where any document cited in the international search report is a document which defines the general state of the art, it shall be indicated by the letter "A" placed next to the citation of the said document.

(d) Where any document cited in the international search report is a document whose publication date occurred earlier than the international filing date of the international application, but later than the priority date claimed in that application, it shall be indicated by the letter "P" next to the citation of the said document.

(e) Where any document cited in the international search report is a document whose publication date occurred after the filing date or the priority date of the international application and is not in conflict with the said application, but is cited for the principle or theory underlying the invention, which may be useful for a better understanding of the invention, or is cited to show that the reasoning or the facts underlying the invention are incorrect, it shall be indicated by the letter "T" next to the citation of the document.

(f) Where any document is cited for reasons other than in paragraphs (a) through (e) above, such documents shall be identified by the letter "L" next to the citation of the said document. The International Searching Authority shall explain such citation in a notation in the International Search Report.

SECTION 509

Manner of Indicating the Claims to Which the Documents Cited in the International Search Report are Relevant

The claims to which cited documents are relevant shall be indicated by placing in the appropriate column of the international search report:

(i) where the cited document is relevant to one claim, the number of that claim; for example, (2) or (17);

(ii) where the cited document is relevant to two or more claims numbered in consecutive order, the numbers of the first and last claims of the series connected by a hyphen; for example, (1–15) or (2–3);

(iii) where the cited document is relevant to one or more claims that are not numbered in consecutive order, the number of each claim placed in ascending order and separated by a comma or commas; for example, (1, 6) or (1, 7, 10);

(iv) where the cited document is relevant to more than one series of claims under (ii) above, or to claims of both categories (ii) and (iii) above, the series or individual claim numbers and series placed in ascending order using commas to separate the several series, or to separate the numbers of individual claims and each series of claims; for example, (1–6, 9–10, 12–15) or (1, 3–4, 6, 9–11).

PART 6—INSTRUCTIONS RELATING TO THE INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

SECTION 601

Determination Whether Applicant is Entitled to Make a Demand

(a) Where the International Preliminary Examining Authority finds that the applicant is not entitled under Article 31(2) or, where there are several applicants, that none of the applicants is entitled under Rule 54.2 to make a demand, the International Preliminary Examining Authority shall notify both the applicant or applicants and the International Bureau accordingly.

(b) Where the International Preliminary Examining Authority finds that, in the case of different applicants for different elected States, none of the applicants indicated for the purposes of a given elected State is entitled under Rule 54.3 to make a demand and that therefore the election of that State shall be considered not to have been made, the International Preliminary Examining Authority shall notify accordingly both the applicant or applicants so indicated and the International Bureau.

SECTION 602

Marking of Replacement Sheets and Renumbering of Sheets of the International Application

(a) The data to be indicated on any replacement sheet according to Rule 66.8(b) shall be indelibly marked by the International Preliminary Examining Authority, so as to admit of direct reproduction in any of the manners set forth in Rule 11.2(a), in the upper right-hand corner of each replacement sheet.

(b) Section 311 applies, *mutatis mutandis*, to the renumbering of sheets of the international application.

SECTION 603 ***

Transmittal of Protest Against Payment of Additional Fee and Decision Thereon

The International Preliminary Examining Authority shall transmit to the applicant, at the latest together with the international preliminary examination report, any decision which it has taken under Rule 68.3(c) on the protest of the applicant against payment of the additional fee. At the same time, it shall transmit to the International Bureau a copy of both the protest and the decision thereon, as well as any request by the applicant to forward the texts of both the protest and the decision thereon to any of the elected Offices.

SECTION 604

Guidelines for Explanations Contained in the International Preliminary Examination Report

Explanations under Rule 70.8 shall clearly point out to which of the three criteria referred to in Article 35(2), taken separately, any cited document is applicable and shall clearly describe, with reference to the cited documents, the reasons supporting the conclusion that any of the said criteria is or is not satisfied.

ANNEX A

NAMES OF STATES

(Members of the Paris Union
as at July 15, 1976)

Short Title	Full Name
Algeria	Democratic and Popular Republic of Algeria
Argentina	Argentine Republic
Australia	Commonwealth of Australia
Austria	Republic of Austria
Belgium	Kingdom of Belgium
Benin	Benin People's Republic
Brazil	Federative Republic of Brazil
Bulgaria	People's Republic of Bulgaria
Cameroon	United Republic of Cameroon
Canada	Canada
Central African Republic	Central African Republic
Chad	Republic of Chad
Congo	People's Republic of the Congo
Cuba	Republic of Cuba
Cyprus	Republic of Cyprus
Czechoslovakia	Czechoslovak Socialist Republic
Denmark	Kingdom of Denmark
Dominican Republic	Dominican Republic
Egypt	Arab Republic of Egypt
Finland	Republic of Finland
France	French Republic
Gabon	Gabonese Republic
German Democratic Republic	German Democratic Republic
Germany (Federal Republic of)	Federal Republic of Germany
Ghana	The Republic of Ghana
Greece	Hellenic Republic
Haiti	Republic of Haiti
Holy See	Holy See
Hungary	Hungarian People's Republic
Iceland	Republic of Iceland
Indonesia	Republic of Indonesia
Iran	Empire of Iran
Iraq	Republic of Iraq
Ireland	Ireland
Israel	State of Israel
Italy	Italian Republic
Ivory Coast	Republic of the Ivory Coast
Japan	Japan
Jordan	Hashemite Kingdom of Jordan
Kenya	Republic of Kenya
Lebanon	Lebanese Republic
Libya	Libyan Arab Republic
Liechtenstein	Principality of Liechtenstein

Annex A

Luxembourg	Grand Duchy of Luxembourg
Madagascar	Malagasy Republic
Malawi	Republic of Malawi
Malta	Malta
Mauritania	Islamic Republic of Mauritania
Mauritius	Mauritius
Mexico	United Mexican States
Monaco	Principality of Monaco
Morocco	Kingdom of Morocco
Netherlands	Kingdom of the Netherlands
New Zealand	New Zealand
Niger	Republic of the Niger
Nigeria	Federal Republic of Nigeria
Norway	Kingdom of Norway
Philippines	Republic of the Philippines
Poland	Polish People's Republic
Portugal	Portuguese Republic
Republic of South Viet-Nam	Republic of South Viet-Nam
Romania	Socialist Republic of Romania
San Marino	Republic of San Marino
Senegal	Republic of Senegal
South Africa	Republic of South Africa
Southern Rhodesia	Southern Rhodesia
Soviet Union	Union of Soviet Socialist Republics
Spain	Spanish State
Sri Lanka	Republic of Sri Lanka
Sweden	Kingdom of Sweden
Switzerland	Swiss Confederation
Syrian Arab Republic	Syrian Arab Republic
Togo	Togolese Republic
Trinidad and Tobago	Trinidad and Tobago
Tunisia	Republic of Tunisia
Turkey	Republic of Turkey
Uganda	Republic of Uganda
United Kingdom	United Kingdom of Great Britain and Northern Ireland
United Republic of Tanzania	United Republic of Tanzania
United States of America	United States of America
Upper Volta	Republic of the Upper Volta
Uruguay	Eastern Republic of Uruguay
Yugoslavia	Socialist Federal Republic of Yugoslavia
Zaire	Republic of Zaire
Zambia	Republic of Zambia

ANNEX B

CODE FOR IDENTIFYING STATES AND ORGANIZATIONS*

AG	ALGERIA
AR	ARGENTINA
AU	AUSTRALIA
BE	BELGIUM
BG	BULGARIA
BR	BRAZIL
CA	CANADA
CB	ZAIRE
CF	CONGO
CH	SWITZERLAND
CI	IVORY COAST
CL	SRI LANKA
CS	CZECHOSLOVAKIA
CU	CUBA
CV	HOLY SEE
CY	CYPRUS
DA	BENIN
DK	DENMARK
DL	GERMAN DEMOCRATIC REPUBLIC
DR	DOMINICAN REPUBLIC
DT	GERMANY, FEDERAL REPUBLIC OF
EI	IRELAND
ES	SPAIN
ET	EGYPT
FL	LIECHTENSTEIN
FR	FRANCE
GA	GABON
GB	UNITED KINGDOM
GH	GHANA
GR	GREECE
HI	HAITI
HU	HUNGARY
ID	INDONESIA
IL	ISRAEL
IQ	IRAQ
IR	IRAN
IS	ICELAND
IT	ITALY
JA	JAPAN
JO	JORDAN
KA	CAMEROON
KE	KENYA
LB	LEBANON
LU	LUXEMBOURG
LY	LYBIA
MA	MOROCCO
MC	MONACO
MD	MADAGASCAR
ML	MALTA
MS	MAURITIUS
MT	MAURITANIA
MW	MALAWI
MX	MEXICO
NI	NIGER

* The States listed are those which are members of the Paris Union. This code is, for the most part, based upon ICIREPAT recommendations.

Annex B

NL	NETHERLANDS
NO	NORWAY
NZ	NEW ZEALAND
OE	AUSTRIA
PH	PHILIPPINES
PO	POLAND
PT	PORTUGAL
RH	SOUTHERN RHODESIA
RU	ROMANIA
SF	FINLAND
SM	SAN MARINO
SN	SENEGAL
SR	SYRIAN ARAB REPUBLIC
SU	SOVIET UNION
SW	SWEDEN
TA	UNITED REPUBLIC OF TANZANIA
TD	TRINIDAD AND TOBAGO
TN	TUNISIA
TO	TOGO
TR	TURKEY
TS	CHAD
UG	UGANDA
US	UNITED STATES OF AMERICA
UV	UPPER VOLTA
UY	URUGUAY
VS	REPUBLIC OF SOUTH VIET-NAM
WN	NIGERIA
YU	YUGOSLAVIA
ZA	SOUTH AFRICA
ZB	ZAMBIA
ZR	CENTRAL AFRICAN REPUBLIC

AM	AFRICAN INTELLECTUAL PROPERTY OFFICE
EP	EUROPEAN PATENT OFFICE
IB	INTERNATIONAL PATENT INSTITUTE
WO	INTERNATIONAL BUREAU OF WIPO

NOTE

ICIREPAT is at present considering the enlargement of the ICIREPAT Standard ST.3 to include all geographical entities listed in the ISO Alpha-2 Code (ISO Standard 3166). All the geographical entities in the enlarged ST.3 should be coded according to the ISO Alpha-2 Code, except for Austria, German Democratic Republic, Germany (Federal Republic of), Finland, Ireland, Japan, Poland, Rumania and Sweden, for which the above ICIREPAT two-letter codes should be maintained.

The revised Standard ST.3 if and once adopted by the Plenary Committee of ICIREPAT, will appear in this Annex.

ANNEX C

STANDARD CODE FOR IDENTIFICATION OF DIFFERENT KINDS OF PATENT DOCUMENTS

Introduction

1. The recommendation provides for groups of letter codes in order to distinguish patent documents. The letter codes also facilitate the storage and retrieval of such documents.

2. If any Office wants to amplify the information contained in the letter code, this letter code may be optionally associated with a numerical code. The meaning of such numerical code should then be defined by each Patent Office availing itself of this option.

3. The code also provides for a letter for non-patent literature documents (N) and for documents to be restricted to the internal use of Patent Offices (X) (e.g. confidential documents, not to be disclosed outside the Office). See in this respect also ST.1 (ICIREPAT Manual pages 4.3.1.1 to 4.3.1.4).

Definitions

4. For the purposes of this recommendation, the expression "patent documents" includes patents for inventions, inventors' certificates, utility certificates, utility models, patents or certificates of addition, inventors' certificates of addition, utility certificates of addition and published applications therefor.

5. For the purposes of this recommendation, the term "entry in an official gazette" means at least one comprehensive announcement in an official gazette regarding the making available to the public of the complete text, claims (if any) and drawings (if any) of a patent document.

6. For the purposes of this recommendation, the terms "publication" and "published" are used in the sense of making available

(i) a patent document to the public for inspection or supplying a copy on request

(ii) multiple copies of a patent document produced by printing or like process

Explanation: If, at a particular procedural stage, a copy of the document is first made available to the public for inspection or copying and is then, at the same procedural stage, made available in multiple copies produced by printing or like process, only a single publication is considered to have occured. If, on the other hand, multiple reproduction results from a new procedural stage, this reproduction is considered to be a further publication of the document, even if the texts at the two stages are identical.

7. According to certain national patent laws or regulations, the same patent application may be published at various procedural stages. For the purposes of this recommendation, a publication level is defined as the level corresponding to a procedural stage at which normally a document is published under a given national patent law.

Recommendation

8. It is recommended that the code:

(a) be used for the recording of the "kind of document" in machine-readable data carriers, such as 80-column punched cards, magnetic tapes, aperture cards, etc;

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(b) be used on the first page of patent documents, preferably near the document number, if these have been published in the sense of paragraph 6;

(c) be used in entries in official gazettes or, if all entries in a section of the Gazette relate to the same kind of a document at the beginning of such a section.

(d) be used for the identification of patent documents cited in "Search Reports" and "Lists of References" in patent documents (INID Number 56).

9. Code

The code is subdivided into mutually exclusive groups of letters. The groups characterize patent documents and documents specified in paragraph 3. Groups 1-5 comprise one or several letters enabling identification of documents pertaining to different publication levels

Group 1 Use for primary or major series of patent documents

A First publication level
B Second publication level
C Third publication level

Group 2 Use for secondary series of patent documents

E First publication level
F Second publication level
G Third publication level

Group 3 Use for further series of patent documents, as the special requirements of each Office may be

H
I

Group 4 Use for medicament patent documents

M

Group 5 Use for utility model documents having a numbering series other than the documents of Group 1

U First publication level
Y Second publication level
Z Third publication level

Group 6 Other (see paragraph 3)

N Non-patent literature documents
X Documents restricted to the internal use of Offices

10. It is understood that documents resulting from a patent application and being identified as the major series will fall under Group 1 (e.g. DT Offenlegungsschrift, Auslegeschrift and Patentschrift). However, documents identified as a secondary series will fall under Group 2 (e.g. FR patent of addition under old law, US reissue). In exceptional cases of need for a further series, Group 3 is reserved for such purposes (e.g. US defensive publication). Group 4 applies only, at present, to special documents concerning the medicament patents published in France. In any country would publish similar documents, Group 4 should then be used.

11. As indicated in paragraph 2, the above letter code may optionally be associated with a numerical code to amplify the information represented by the letter code. For this numerical code only digits 1 to 9 should be used. The significance of this code will be defined by any national office applying such code and communicated to the International Bureau, which will publicize this information. The numerical code must always be interpreted in conjunction with the country code and the above letter code.

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12. As an appendix to this recommendation a list of patent documents, past and currently published, and intended to be published in the future, divided in accordance with the code, is given.

[Appendices I & II follow]

Original: STAC III No. 43d, expanded to STAC III No. 93a
Adopted by the first session of the TCC
Revised and adopted by the fifth session of the TCST (document IC/TCST/17(73), Annex III)
Revised version amended and adopted by the tenth session of the TCC (document IC/TCC/X/19, Annex IV)
Amended and adopted by the fifth PLC ordinary session (document IC/PLC/V/II, paragraphs 65 to 68)
Amended by the TCC at its thirteenth and fourteenth sessions (documents IC/TCC/XIII/10 and IC/TCC/XIV/18)

Adopted by the seventh PLC ordinary session (document IC/PLC/VII/16, paragraph 30)

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Appendix I

List of Patent Documents, Past and Currently Published, and Intended to be Published in the Future, Divided in Accordance with this Code

Code: A **Patent Documents Numbered in Primary or Major Series - First Publication Level**

Examples:	**Austria**	**Patent Application published in the sense of paragraph 6(i)**
	Belgium	**Brevet d'invention/Uitvindingsoctrooi**
	Belgium	**Brevet de perfectionnement/Verbeteringsoctrooi**
	Bulgaria	**Opisanie na izobretenie po patent**
	Canada	**Patent**
	Cuba	**Patent Application published in the sense of paragraph 6(i)**
	Czechoslovakia	**Patent Application published in the sense of paragraph 6(i)**
	Czechoslovakia	**Inventors' Certificate Application published in the sense of paragraph 6(i)**
	Denmark	**Patent Application published in the sense of paragraph 6(i)**
	Egypt	**Patent specification**
	Europat	**Document published after 18 months**
	Finland	**Patent Application published in the sense of paragraph 6(i)**
	France	**Brevet d'invention (old law)**
	France	**Brevet d'invention, première et unique publication**
	France	**Certificat d'addition à un brevet d'invention, première et unique publication**
	France	**Certificat d'utilité, première et unique publication**
	France	**Certificat d'addition à un certificat d'utilité, première et unique publication**
	France	**Demande de brevet d'invention, première publication**
	France	**Demande de certificat d'addition à un brevet d'invention première publication**
	France	**Demande de certificat d'utilité, première publication**
	France	**Demande de certificat d'addition à un certificat d'utilité, première publication**
	German Democratic Republic	**Patentschrift (Ausschliessungspatent), granted in accordance with paragraph 5.1 of the Patent Amendment Act of the German Democratic Republic**
	German Democratic Republic	**Patentschrift (Wirtschaftspatent), granted in accordance with paragraph 5.1 of the Patent Amendment Act of the German Democratic Republic**
	Germany, Federal Republic of	**Offenlegungsschrift**
	Hungary	**Patent Application published in the sense of paragraph 6(i)**
	India	**Patent specification**
	Ireland	**Patent specification**
	Italy	**Brevetto per invenzione industriale**
	Japan	**Kokai tokkyo koho**

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Code: A (continued)		
Examples:	**Luxembourg**	**Brevet d'invention**
	Luxembourg	**Certificat d'addition à un brevet d'invention**
	Netherlands	**Ter inzage gelegde octrooiaanvrage**
	Norway	**Patent Application published in the sense of paragraph 6(i)**
	Pakistan	**Patent specification**
	PCT	**Pamphlet published after 18 months**
	Poland	**Opis patentowy**
	Romania	**Descrierea invenţiei**
	Soviet Union	**Opisanie izobreteniya k patentu**
	Soviet Union	**Opisanie izobreteniya k avtorskomy svidetelstvu**
	Spain	**Patente de invención**
	Sweden	**Patent Application published in the sense of paragraph 6(i)**
	Switzerland	**Auslegeschrift/Mémoire Exposé/Esposto Memoriale (Patent Application published in the sense of paragraphs 6(i) and 6(ii) pertaining to the technical fields for which search and examination as to novelty are made)**
	Switzerland	**Patentschrift/Exposé d'invention/Esposto d'invenzione (Patent published in the sense of paragraph 6(ii) and pertaining to the technical fields for which neither search nor examination as to novelty are made)**
	United Kingdom	**Patent specification**
	United States	**Patent**
	Yugoslavia	**Patentni spis**
Code: B	**Patent Documents Numbered in Primary or Major Series - Second Publication Level**	
Examples:	**Australia**	**Patent specification**
	Austria	**Patentschrift**
	Cuba	**Patente de invención**
	Czechoslovakia	**Popis vynálezu k patentu**
	Czechoslovakia	**Popis vynálezu k autorskému osvědčení**
	Denmark	**Fremlaeggelsesskrift**
	Finland	**Kuulutusjulkaisu - Utläggningsskrift**
	France	**Brevet d'invention, deuxième publication de l'invention**
	France	**Certificat d'addition à un brevet d'invention, deuxième publication de l'invention**
	France	**Certificat d'utilité, deuxième publication de l'invention**
	France	**Certificat d'addition à un certificat d'utilité, deuxième publication de l'invention**
	German Democratic Republic	**Patentschrift (Ausschließungspatent), granted in accordance with paragraph 29 of the Patent Act of the German Democratic Republic**
	German Democratic Republic	**Patentschrift (Wirtschaftspatent), granted in accordance with paragraph 29 of the Patent Act of the German Democratic Republic**
	Germany, Federal Republic of	**Auslegeschrift**

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Code: B (continued)		
Examples:	Hungary	Szabadalmi leiras
	Japan	Tokkyo koho
	Netherlands	Openbaar gemaakte octrooiaanvrage
	Norway	Utlegningsskrift
	Sweden	Utläggningsskrift
	Switzerland	Patentschrift/Exposé d'invention/Esposto d'invenzione (Patent published in the sense of paragraph 6(ii) and pertaining to the technical fields for which search and examination as to the novelty are made)
	United Kingdom	Amended Patent Specification
Code: C	Patent Documents Numbered in Primary or Major Series - Third Publication Level	
Examples:	Denmark	Patent
	Finland	Patentti - Patent
	Germany, Federal Republic of	Patentschrift
	Netherlands	Octrooi
	Norway	Patent
	Sweden	Patentskrift
Code: E	Patent Documents Numbered in Secondary Series - First Publication Level	
Examples:	France	Certificat d'addition à brevet d'invention (old law)
	United States	Reissue
Code: H	Patent Documents numbered in further series	
Example:	United States	Defensive publication
Code: M	Medicament Patent Documents	
Examples:	France	Brevet spécial de médicament
	France	Addition à un brevet spécial de médicament
Code: U	Utility Model Documents Numbered in Series other than the Documents of Group I - First Publication Level	
Examples:	Germany, Federal Republic of	Gebrauchsmuster
	Japan	Kokai jitsuyo shinan koho
	Spain	Utility Model Application published in the sense of paragraph 6(i)
Code: Y	Utility Model Documents Numbered in Series other than the Documents of Group I - Second Publication Level	
Examples:	Japan	Jitsuyo shinan koho
	Spain	Modelo de utilidad

[Appendix II follows]

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Appendix II

List of Patent Documents, Past and Currently Published, broken down by issuing country and coded in accordance with the ST.8 Code

Issuing country	Kind of published patent document			Letter code	Associated numerical code (when defined)
	Designation in language of issuing country (and, if required, transliteration in Latin characters)	Translation into English (when needed)	Identification of document		
Australia	Unexamined complete specification open to public inspection (not marked on document)		Unexamined Patent Application published in the sense of paragraph 6(i)	A	
	Patent specification		Patent published in the sense of paragraph 6(ii)	B	
Austria	Aufgebot (not marked on document but indicated as such in the Official Gazette)	Document laid open	Patent Application published in the sense of paragraph 6(i)	A	
	Patentschrift	Patent specification	Patent published in the sense of paragraph 6(ii)	B	
Belgium	Brevet d'invention/ Uitvindingsoctrooi	Patent of invention	Patent published in the sense of paragraph 6(ii)	A	
	Brevet de perfectionnement/ Verbeteringsoctrooi	Patent of improvement	Patent of improvement published in the sense of paragraph 6(ii)	A	
	Brevet d'importation/ Invoeringsoctrooi	Patent of importation	Patent of importation published in the sense of paragraph 6(ii)	A	
Bulgaria	ОПИСАНИЕ НА ИЗОБРЕТЕНИЕ ПО ПАТЕНТ (Opisanie na izobretenie po patent)	Description of invention for a patent	Patent published in the sense of paragraph 6(ii)	A	
	ОПИСАНИЕ НА ИЗОБРЕТЕНИЕ ПО АВТОРСКО СВИДЕТЕЛСТВО (Opisanie na izobretenie po avtorsko svidetelstvo)	Description of invention for an author's certicate	Inventor's certificate published in the sense of paragraph 6(ii)	A	
Canada	Patent/Brevet		Patent published in the sense of paragraph 6(ii)	A	
	Reissue Patent/Brevet de redélivrance		Patent reissued and republished in the sense of paragraph 6(ii)	B	
Cuba	Publicación de la solicitud (not marked on document)	Publication of the application	Patent application published in the sense of paragraph 6(i)	A	
	Patente de invención	Patent of invention	Patent published in the sense of paragraph 6(ii)	B	

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Issuing country	Kind of published patent document			Letter code	Associated numerical code (when defined)
	Designation in language of issuing country (and, if required, transliteration in Latin characters)	Translation into English (when needed)	Identification of document		
Czechoslovakia	Přihláska vynálezu (se žádostí o autorské osvědčení)	Application for an invention asking for author's certificate	Application for inventor's certificate published in the sense of paragraph 6(i), in accordance with Law No. 84 of 01.11.1972	A	1
	Přihláska vynálezu (se žádostí o patent)	Application for an invention asking for a patent	Patent application published in the sense of paragraph 6(i), in accordance with Law No. 84 of 01.11.1972	A	2
	Patentová přihláska or Přihláska vynálezu	Patent application or Application for invention	Patent application published in the sense or paragraph 6(i) up to patent No. 149 260 (granted before the entry into force of Law No. 84 01.11.1972)	A	5
	Popis vynálezu k autorskému osvědčení	Description of an invention for an author's certificate	Inventor's certificate published in the sense of paragraph 6(ii), granted in accordance with Law No. 84 of 01.11.1972	B	1
	Popis vynálezu k patentu	Description of an invention for a patent	Patent published in the sense of paragraph 6(ii), granted in accordance with Law No. 84 of 01.11.1972	B	2
	Popis vynálezu k autorskému osvědčení	Description of an invention for an author's certificate	Dependant author's certificate published in the sense of paragraph 6(ii), granted in accordance with Law No. 84 of 01.11.1972	B	3
	Popis vynálezu k patentu	Description of an invertion for a patent	Dependent patent published in the sense of paragraph 6(ii), granted in accordance with Law No. 84 of 01.11.1972	B	4
	Patentový spis	Patent specification	Patent published in the sense of paragraph 6(ii), up to No. 149 260, granted before the entry into force of Law No. 84 of 01.11.1972	B	5
Denmark	Almindelig tilgaengelig patentansøgning	Patent application accessible to the public	Patent application published in the sense of paragraph 6(i)	A	
	Fremlaeggelsesskrift	Document laid open	Patent application published after examination as to novelty in the sense of paragraph 6(ii)	B	

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Issuing country	Kind of published patent document			Letter code	Associated numerical code (when defined)
	Designation in language of issuing country (and, if required, transliteration in Latin characters)	Translation into English (when needed)	Identification of document		
Denmark cont'd.	Patent	Patent	Patent published in the sense of paragraph 6(ii)	C	
Egypt	إدارة براءات الاختراع (Idarat bara'at alikhtirah)	Authority for Patent Delivery	Patent published in the sense of paragraph 6(ii)	A	
Finland	Julkiseksi tullut patenttihakemus (not marked on the document)	Patent application made accessible to the public	Patent application published in the sense of paragraph 6(i)	A	
	Kuulutusjulkaisu - Utläggningsskrift	Document laid open	Patent application published after examination as to novelty in the sense of paragraphs 6(i) and 6(ii)	B	
	Patentti-Patent	Patent	Patent published in the sense of paragraph 6(ii)	C	
France	Demande de brevet d'invention	Application for patent of invention	Patent application, first publication, published in the sense of paragraph 6(ii)	A	1
	Demande de certificat d'addition à un brevet d'invention	Application for a certificate of addition to a patent of invention	Application for a certificate of addition, first publication, published in the sense of paragraph 6(ii)	A	2
	Demande de certificat d'utilité	Application for certificate of utility	Utility certificate application, first publication, published in the sense of paragraph 6(ii)	A	3
	Demande de certificat d'addition à un certificat d'utilité	Application for a certificate of addition to a certificate of utility	Application for a certificate of addition to a utility certificate, first publication, published in the sense of paragraph 6(ii)	A	4
	Brevet d'invention	Patent of invention	Patent, first and only publication, published in the sense of paragraph 6(ii)	A	5
	Certificat d'addition à un brevet d'invention	Certificate of addition to a patent of invention	Certificate of addition to a patent, first and only publication, published in the sense of paragraph 6(ii)	A	6

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Issuing country	Kind of published patent document			Letter code	Associated numerical code (when defined)
	Designation in language of issuing country (and, if required, transliteration in Latin characters)	Translation into English (when needed)	Identification of document		
France cont'd	Certificat d'utilité	Certificate of utility	Utility certificate, first and only publication, published in the sense of paragraph 6(ii)	A	7
	Certificat d'addition à un certificat d'utilité	Certificate of addition to a certificate of utility	Certificate of addition to a utility certificate, first and only publication, published in the sense of paragraph 6(ii)	A	8
	Brevet d'invention	Patent of invention	Patent, second publication, published in the sense of paragraph 6(ii)	B	1
	Certificat d'addition à un brevet d'invention	Certificate of addition to a patent of invention	Certificate of addition to a patent, second publication, published in the sense of paragraph 6(ii)	B	2
	Certificat d'utilité	Certificate of utility	Utility certificate, second publication, published in the sense of paragraph 6(ii)	B	3
	Certificat d'addition à un certificat d'utilité	Certificate of addition to a certificate of utility	Certificate of addition to a utility certificate, second publication, published in the sense of paragraph 6(ii)	B	4
	Brevet d'invention	Patent of invention	Patent (old law) published in the sense of paragraph 6(ii)	A	
	Certificat d'addition à un brevet d'invention	Certificate of addition to a patent of invention	Certificate of addition to a patent (old law) published in the sense of paragraph 6(ii)	E	
	Brevet spécial de médicament	Special patent for medicament	Medicament patent (old law) published in the sense of paragraph 6(ii)	M	
	Certificat d'addition à un brevet spécial de médicament	Certificate of addition to a special patent for medicament	Certificate of addition to a medicament patent (old law) published in the sense of paragraph 6(ii)	M	
German Democratic Republic	Patentschrift (Ausschliessungspatent)	Patent specification (Exclusive Patent)	Exclusive Patent, granted in accordance with paragraph 5.1 of the Patent Amendment Act of the German Democratic Republic, published in the sense of paragraph 6(ii)	A	
	Patentschrift (Wirtschaftpatent)	Patent specification (Economic Patent)	Industrial Patent, granted in accordance with paragraph 5.1 of the Patent Amendment Act of the German Democratic Republic, published in the sense of paragraph 6(ii)	A	

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Issuing country	Kind of published patent document			Letter code	Associated numerical code (when defined
	Designation in language of issuing country (and, if required, transliteration in Latin characters)	Translation into English (when needed)	Identification of document		
German Democratic Republic cont'd	Patentschrift (Ausschliessungspatent)	Patent specification (Exclusive patent)	Exclusive patent granted in accordance with paragraph 29 of the Patent Act of the German Democratic Republic, (2nd publication after examination as to novelty whenever this examination is effected), published in the sense of paragraph 6(ii)	B	
	Patentschrift (Wirtschaftspatent)	Patent specification (Economic patent)	Industrial patent granted in accordance with paragraph 29 of the Patent Act of the German Democratic Republic (2nd publication after examination as to novelty whenever this examination is effected), published in the sense of paragraph 6(ii)	B	
	Berichtigte Patentschrift (Ausschliessungspatent)	Corrected patent specification (Exclusive patent)	Corrected patent (Exclusive patent) published in the sense of paragraph 6(ii)	C	
	Berichtigte Patentschrift (Wirtschaftspatent)	Corrected patent specification (Economic patent)	Corrected patent (Industrial patent) published in the sense of paragraph 6(ii)	C	
Germany (Federal Republic of)	Offenlegungsschrift	Document open for inspection	Patent application published, before examination as to novelty, in the sense of paragraph 6(ii)	A	
			- 1st publication	A	1
			- 2nd publication. Modified reprint following A1 Offenlegungsschrift or B1 Auslegeschrift	A	2
			- 3rd publication. Modified reprint following A2 Offenlegungsschrift or B2 Auslegeschrift	A	3
	Auslegeschrift	Document laid open	Patent application published, after examination as to novelty, in the sense of paragraph 6(ii)	B	
			- 1st publication. Offenlegunsschrift not yet published	B	1
			- 2nd publication. Normally following an A1 Offenlegungsschrift or B1 Auslegeschrift	B	2

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Issuing country	Kind of published patent document			Letter code	Associated numerical code (when defined)
	Designation in language of issuing country (and, if required, transliteration in Latin characters)	Translation into English (when needed)	Identification of document		
Germany (Federal Republic of) cont'd.			- 3rd publication. Following an A2 Offenlegungsschrift or B2 Auslegeschrift	B	3
			- 4th publication. Following an A3 Offenlegungsschrift or B3 Auslegeschrift	B	4
	Patentschrift	Patent specification	Patent published in the sense of paragraph 6(ii)	C	
			- 1st publication. Offenlegungsschrift and Auslegeschrift not published	C	1
			- 2nd publication. Modified reprint normally following a B1 Auslegeschrift or C1 Patentschrift	C	2
			- 3rd publication. Normally following a B2 Auslegeschrift and an A1 Offenlegungsschrift or following a B2 Auslegeschrift with a preceding B1 Auslegeschrift as well	C	3
			- 4th publication. Following a B3 Auslegeschrift or C3 Patentschrift	C	4
			- 5th publication. Following a B4 Auslegeschrift or a C4 Patentschrift	C	5
	Gebrauchsmuster	Utility model	Utility model published in the sense of paragraph 6(ii)	U	
Hungary	Közzétett szabadalmi bejelentés	Published patent application	Patent application published in the sense of paragraph 6(i)	A	
	Szabadalmi leírás	Patent specification	Patent published in the sense of paragraph 6(ii)	B	
India	Patent specification		Patent published in the sense of paragraph 6(ii)	A	
Ireland	Patent specification		Patent published in the sense of paragraph 6(ii)	A	
Italy	Brevetto per invenzione industriale	Patent for industrial invention	Patent published in the sense of paragraph 6(ii)	A	

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Issuing country	Kind of published patent document			Letter code	Associated numerical code (when defined)
	Designation in language of issuing country (and, if required, transliteration in Latin characters)	Translation into English (when needed)	Identification of document		
Japan	公開特許公報 (Kokai tokkyo koho)	Preliminary publication of patent	Patent application published before examination as to novelty in the sense of paragraphs 6(i) and 6(ii)	A	
	特許公報 (Tokkyo koho)	Patent publication	Patent application published after examination as to novelty in the sense of paragraphs 6(i) and 6(ii)	B	
	公開実用新案公報 (Kokai jitsuyo shinan koho)	Preliminary publication of Utility Model	Utility model application published before examination as to novelty in the sense of paragraph 6(i)	U	
	実用新案公報 (Jitsuyo shinan koho)	Utility Model publication	Utility model application published after examination as to novelty in the sense of paragraphs 6(i) and 6(ii)	Y	
Luxembourg	Brevet d'invention	Patent of invention	Patent published in the sense of paragraph 6(ii)	A	
	Certificat d'addition à un brevet d'invention	Certificate of addition to a patent of invention	Certificate of addition to a patent published in the sense of paragraph 6(ii)	A	
Monaco	Brevet d'invention	Patent of invention	Patent published in the sense of paragraph 6(ii)	A	
Netherlands	Terinzagelegging	Patent application laid open	Patent application published in the sense of paragraphs 6(i) and 6(ii)	A	
	Openbaarmaking	Published patent application	Patent application published after examination in the sense of paragraphs 6(i) and 6(ii)	B	
	Octrooi	Patent	Patent published in the sense of paragraph 6(ii)	C	
Norway	Almant tilgjengelige patentsöknader (not marked on the document)	Patent application accessible to the public	Patent application published in the sense of paragraph 6(i)	A	
	Utlegningsskrift	Document laid open	Patent application published after examination as to novelty in the sense of paragraph 6(ii)	B	

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Issuing country	Kind of published patent document			Letter code	Associated numerical code (when defined)
	Designation in language of issuing country (and, if required, transliteration in Latin characters)	Translation into English (when needed)	Identification of document		
Norway cont'd.	Patent	Patent	Patent published in the sense of paragraph 6(ii)	C	
Pakistan	Patent specification		Patent published in the sense of paragraph 6(ii)	A	
Poland			Patent application published in the sense of paragraph 6(i)	A	
	Opis patentowy Patentu tymczasowego	Description of patent	Patent published in the sense of paragraph 6(ii)	B	
Romania	Descrierea invenţiei	Description of the invention	Patent published in the sense of paragraph 6(ii)	A	
Soviet Union	ОПИСАНИЕ ИЗОБРЕТЕНИЯ к патенту (Opisanie izobreteniya k patentu)	Description of the invention for a patent	Patent published in the sense of paragraph 6(ii)	A	
	ОПИСАНИЕ ИЗОБРЕТЕНИЯ к авторскому свидетельству (Opisanie izobreteniya k avtorskomu svidetelstvu)	Description of the invention for an author's certificate	Inventor's certificate published in the sense of paragraph 6(ii)	A	
Spain	Patente de invención	Patent of invention	Patent published in the sense of paragraph 6(i)	A	
	Patente de introducción	Patent of introduction	Patent of importation published in the sense of paragraph 6(i)	A	
	Certificado de adición	Certificate of addition	Certificate of addition published in the sense of paragraph 6(i)	A	
	Solicitud de Modelo de Utilidad	Application for a utility model	Utility Model Application published in the sense of paragraph 6(i)	U	
	Modelo de Utilidad	Utility Model	Utility Model published in the sense of paragraph 6(i)	Y	
Sweden	Allmänt tillgänglig patentansökan	Patent application accessible to the public	Patent Application published in the sense of paragraph 6(i)	A	
	Utläggningsskrift	Document laid open	Patent Application published after examination as to novelty in the sense of paragraphs 6(i) and 6(ii)	B	

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Issuing country	Kind of published patent document			Letter code	Associated numerical code (when defined)
	Designation in language of issuing country (and, if required, transliteration in Latin characters)	Translation into English (when needed)	Identification of document		
Sweden cont'd.	Patentskrift	Patent document	Patent published in the sense of paragraph 6(ii)	C	
Switzerland	Auslegeschrift/Mémoire Exposé/Esposto Memoriale	Document laid open	Patent Application published after examination as to novelty in the sense of paragraphs 6(i) and 6(ii), and pertaining to the technical fields for which examination as to novelty is made, issued since 1959	A	4
	Patentschrift/Exposé d'invention/Esposto d'invenzione	Patent specification	Patent published in the sense of paragraph 6(ii) and pertaining to the technical fields for which no examination as to novelty is made, issued since 1959	A	5
	Patentschrift/Exposé d'invention/Esposto d'invenzione	Patent specification	Patent published in the sense of paragraph 6(ii) and pertaining to technical fields for which examination as to novelty is made, issued since 1959	B	5
	Patentschrift/Exposé d'invention/Esposto d'invenzione (Hauptpatent/Brevet principal/Brevetto principale)	Patent specification (Main patent)	Patent published in the sense of paragraph 6(ii), issued from 1888 to 1959	A	
	Patentschrift/Exposé d'invention/Esposto d'invenzione (Zusatzpatent/Brevet additionnel/Brevetto addizionale)	Patent specification (Additional patent)	Patent of addition published in the sense of paragraph 6(ii), issued from 1907 to 1959	A	
	Patentschrift/Exposé d'invention/Esposto d'invenzione (Zusatzpatent/Brevet additionnel/Brevetto addizionale)	Patent specification (Additional patent)	Patent of addition published in the sense of paragraph 6(ii) in secondary series from 1888 to 1907	E	
United Kingdom	Patent Specification		Examined Patent Application published in the sense of paragraph 6(ii). Grant of letters Patent usually occurs 3 months after publication.	A	

Annex C

Issuing country	Kind of published patent document			Letter code	Associated numerical code (when defined)
	Designation in language of issuing country (and, if required, transliteration in Latin characters)	Translation into English (when needed)	Identification of document		
United Kingdom (cont'd)	Amended Patent Specification		Amended Specification of a Granted Patent published in the sense of paragraph 6(ii)	B	
United States	Patent		Patent published in the sense of paragraph 6(ii)	A	
	Reissue Patent		Patent reissued and republished in the sense of paragraph 6(ii)	E	
	Defensive Publication		Patent application published without examination or assertion as to novelty, in the sense of paragraph 6(i)	H	
	Defensive Publication		Patent document published in the sense of paragraph 5: Entry of an abstract of the application in the Official Gazette	H	
	Defensive Publication		Patent document published in the sense of paragraph 6(ii): Abstract of an application published in a discreet document form distinctively numbered in a numerical series unique to Defensive Publications	H	
Yugoslavia			Accepted Patent Application published in the sense of paragraph 6(i)	A	
	Patentni spis	Patent specification	Patent published in the sense of paragraph 6(ii)	B	

Annex D (Deleted) ***

ANNEX E

INFORMATION FROM PAMPHLET FRONT PAGE TO BE INCLUDED IN THE GAZETTE UNDER RULE 86.1(i)

The following information shall be extracted from the front page of the pamphlet of each published international application and shall, in accordance with Rule 86.1(i), appear in the corresponding entry of the Gazette:

1. As to the international publication:

1.1 the international publication number

1.2 the date of the international publication

1.3 an indication whether the following items were published in the pamphlet:

1.31 international search report

1.32 declaration under Article 17(2)

1.33 amended claims

1.34 statement under Article 19(1)

1.35 the essence of the comments by the applicant on the translation of the international application as referred to in Rule 48.3(b).

2. as to the international application:

2.1 the title of the invention

2.2 the symbol(s) of the International Patent Classification (IPC)

2.3 the international application number

2.4 the international filing date

3. as to any priority claim:

3.1 the application number of the earlier application

3.2 the date of the earlier application

3.3 the country in or for which the earlier application was filed

4. as to the applicant, inventor and agent:

4.1 their name(s)

4.2 their mailing address(es)

5. as to the designated and elected States:

5.1 their names

5.2 the indication of any wish for a regional patent

5.3 the indication of kind of protection sought, unless patent is sought.

ANNEX F

INFORMATION TO BE PUBLISHED IN THE GAZETTE
UNDER RULE 86.1(v)

1. The time limits applicable under Articles 22 and 39 in respect of each Contracting State.

2. The list of the non-patent literature agreed upon by the International Searching Authorities for inclusion in the minimum documentation.

3. The names of the national Offices which do not wish to receive copies under Article 13(2)(c).

4. The provisions of the national laws of Contracting States concerning international-type search.

5. The text of the agreements entered into between the International Bureau and the International Searching Authorities or the International Preliminary Examining Authorities.

6. The names of the national Offices which entirely or in part waived their rights to any communication under Article 20.

7. The names of the Contracting States which are bound by Chapter II of the PCT.

8. Listing of international publication numbers grouped according to receiving Offices.

9. Listing of international publication numbers grouped according to IPC classification symbols.

10. Listing of international publication numbers grouped according to countries designated.

11. Indication of any subject matter that will not be searched or examined by the various International Searching and Preliminary Examining Authorities under Rules 39 and 67.

ANNEX G

FORMS

I. FORMS TO BE EMPLOYED BY THE RECEIVING OFFICE

Form Identification Number:	Title of Form:	Provisions pursuant to which Form is issued:
PCT/RO/101*	REQUEST	Rule 4
PCT/RO/102	NOTIFICATION CONCERNING PAYMENT OF TRANSMITTAL, SEARCH, AND INTERNATIONAL FEES	Rules 14, 15, 16
PCT/RO/103	INVITATION TO CORRECT THE PURPORTED INTERNATIONAL APPLICATION	Article 11(2)(a)
PCT/RO/104	NOTIFICATION THAT THE PURPORTED INTERNATIONAL APPLICATION IS NOT TREATED AS AN INTERNATIONAL APPLICATION	Rule 20.7(i)
PCT/RO/105	NOTIFICATION OF THE INTERNATIONAL APPLICATION NUMBER AND OF THE INTERNATIONAL FILING DATE	Rule 20.5(c)
PCT/RO/106	INVITATION TO CORRECT DEFECTS IN THE INTERNATIONAL APPLICATION	Article 14(1)
PCT/RO/107	NOTIFICATION OF NON-INCLUSION OF DRAWINGS WITH THE INTERNATIONAL APPLICATION	Article 14(2)
PCT/RO/108	INVITATION TO REQUEST RECTIFICATION	Rule 91.1(d)
PCT/RO/109	NOTIFICATION OF DECISION CONCERNING REQUEST FOR RECTIFICATION	Administrative Instructions, Section 109
PCT/RO/110	INVITATION TO CORRECT PRIORITY DATE	Rule 4.10(d)
PCT/RO/111	NOTIFICATION OF CORRECTION OR CANCELLATION OF PRIORITY CLAIM	Rule 4.10(d)
PCT/RO/112	NOTIFICATION CONCERNING EXPRESSIONS, ETC., NOT TO BE USED IN THE INTERNATIONAL APPLICATION	Rule 9
PCT/RO/113	REQUEST FOR THE RECORDING OF CHANGE IN THE PERSON, NAME, OR ADDRESS OF APPLICANT	Rules 18.5 or 54.4, Administrative Instructions, Section 306
PCT/RO/114	NOTIFICATION OF NON-COLLECTION OF RECORD COPY	Rule 22.2(d), third sentence, Administrative Instructions, Section 315
PCT/RO/115	NOTIFICATION OF INTENTION TO MAKE DECLARATION THAT INTERNATIONAL APPLICATION CONSIDERED WITHDRAWN	Rule 29.4
PCT/RO/116	NOTIFICATION OF DESIGNATIONS CONSIDERED TO BE WITHDRAWN	Rule 29.1(b)
PCT/RO/117	NOTIFICATION THAT INTERNATIONAL APPLICATION CONSIDERED TO BE WITHDRAWN	Articles 14(1), 14(3), 14(4) and Rule 29.1

* Printed Form

PCT/RO/118	NOTIFICATION CONCERNING DOCUMENTS TRANSMITTED	Article 12(1), Rules 20.7(iv), 22.2(e), 26.4(c) and (d), 29.1(a)(i), Administrative Instructions, Sections 309(b)(iii), (c)(ii) and 310(c)(iii), (d)(ii)
PCT/RO/119	NOTIFICATION OF REFUND OF FEES	Rules 15.6 and 16.2
PCT/RO/120	INVITATION TO PAY FEE FOR PREPARATION OF COPIES	Rule 21.1(c)
PCT/RO/121	NOTIFICATION THAT PRIORITY CLAIM CONSIDERED NOT TO HAVE BEEN MADE	Rule 4.10(b), Administrative Instructions, Section 302
PCT/RO/122	NOTIFICATION OF TRANSMITTAL OF REQUESTED DOCUMENTS	Rules 20.9, 22.1(b) and 22.2(d)
PCT/RO/123	NOTIFICATION OF POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY	Rules 90.3(b) and 90.4(b)
PCT/RO/124	NOTIFICATION OF DEFECTIVE POWER OF ATTORNEY OR DEFECTIVE REVOCATION OF POWER OF ATTORNEY	Rules 90.3(c) and 90.4(b)
PCT/RO/125	NOTIFICATION OF RECEIPT OF PAPERS PURPORTING TO BE AN INTERNATIONAL APPLICATION	Administrative Instructions, Section 301
PCT/RO/126	NOTIFICATION CONCERNING LATER SUBMITTED SHEETS OR DRAWINGS	Administrative Instructions, Sections 309 and 310
PCT/RO/127	NOTIFICATION OF DECISION NOT TO ISSUE DECLARATION THAT INTERNATIONAL APPLICATION CONSIDERED WITHDRAWN	Administrative Instructions, Section 312
PCT/RO/128	INVITATION TO PAY FOR REQUESTED DOCUMENTS	Rule 20.9
PCT/RO/129	REQUEST FOR THE RECORDING OF CHANGE IN THE PERSON, NAME OR ADDRESS OF INVENTOR	
PCT/RO/130	REQUEST FOR THE RECORDING OF CHANGE IN THE NAME, OR ADDRESS OF AGENT OR COMMON REPRESENTATIVE	
PCT/RO/131	NOTIFICATION OF LACK OF SIGNATURE WITH REGARD TO CORRESPONDENCE SUBMITTED BY APPLICANT	Rules 92.1(a) and 92.1(b)
PCT/RO/132	COMMUNICATION TO THE APPLICANT IN CASES FOR WHICH NO OTHER FORM IS APPLICABLE	

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II. FORMS TO BE EMPLOYED BY THE INTERNATIONAL SEARCHING AUTHORITY

Form Identification Number:	Title of Form:	Provisions pursuant to which Form is issued:
PCT/ISA/201	INTERNATIONAL-TYPE SEARCH REPORT	Article 15(5)
PCT/ISA/202	NOTIFICATION OF RECEIPT OF SEARCH COPY	Rule 25.1
PCT/ISA/203	DECLARATION OF NON-ESTABLISHMENT OF INTERNATIONAL SEARCH REPORT	Article 17(2)(a)
PCT/ISA/204	INVITATION TO COMMENT ON ABSTRACT	Rule 38.2(a)
PCT/ISA/205	NOTIFICATION OF ABSTRACT APPROVED OR ESTABLISHED	Rule 44.2(c)
PCT/ISA/206	INVITATION TO PAY ADDITIONAL FEES	Article 17(3)(a) and Rule 40.1
PCT/ISA/207	INVITATION TO COMMENT ON DRAFT TRANSLATION	Rule 48.3(b)
PCT/ISA/208	NOTIFICATION OF ACTION TAKEN CONCERNING COMMENTS ON DRAFT TRANSLATION	Administrative Instructions, Section 506
PCT/ISA/209	NOTIFICATION OF FACTS WHICH SHOULD HAVE PRECLUDED THE ACCORDING OF AN INTERNATIONAL FILING DATE	Rule 29.3
PCT/ISA/210*	INTERNATIONAL SEARCH REPORT	Article 18(1) and Rule 43
PCT/ISA/211	NOTIFICATION OF TRANSMITTAL OF REQUESTED COPIES OF CITED DOCUMENTS	Article 20(3)
PCT/ISA/212	NOTIFICATION OF DECISION OF PROTEST	Rule 40.2(c) and Administrative Instructions, Section 502
PCT/ISA/213	NOTIFICATION OF REFUND OF SEARCH FEE	Rules 16.3 and 41.1
PCT/ISA/214	REQUEST FOR THE PRODUCTION OF PROOF	Rule 83
PCT/ISA/215	NOTIFICATION OF CERTAIN DEFECTS IN THE INTERNATIONAL APPLICATION	Rule 28.1(a)
PCT/ISA/216	INVITATION TO REQUEST RECTIFICATION	Rule 91.1(d), second sentance
PCT/ISA/217	NOTIFICATION CONCERNING REQUEST FOR RECTIFICATION	Administrative Instructions, Section 109
PCT/ISA/218	NOTIFICATION CONCERNING EXPRESSIONS, ETC. NOT TO BE USED IN INTERNATIONAL APPLICATIONS	Rule 9
PCT/ISA/219	NOTIFICATION CONCERNING DOCUMENTS TRANSMITTED	Rules 44.1, 44.3(c) and 48.3(b)
PCT/ISA/220	NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT OR THE DECLARATION	Rule 44.1
PCT/ISA/221	INVITATION TO PAY FOR REQUESTED COPIES OF CITED DOCUMENTS	Rule 44.3(b)
PCT/ISA/222	INVITATION TO PAY FEE FOR PREPARATION OF DRAFT TRANSLATION	Rule 48.3
PCT/ISA/223	NOTIFICATION OF LACK OF SIGNATURE WITH REGARD TO CORRESPONDENCE SUBMITTED BY APPLICANT	Rules 92.1(a) and 92.1(b)
PCT/ISA/224	COMMUNICATION TO THE APPLICANT IN CASES FOR WHICH NO OTHER FORM IS APPLICABLE	

* Printed Form

III. FORMS TO BE EMPLOYED BY THE INTERNATIONAL BUREAU

Form Identification Number:	Title of Form:	Provisions pursuant to which Form is issued:
PCT/IB/301	NOTIFICATION OF RECEIPT OF RECORD COPY	Rule 24.2(a)
PCT/IB/302	NOTIFICATION OF DESIGNATION	Rule 24.2(a)
PCT/IB/303	REQUEST FOR COPIES OF PAPERS	Rule 20.7(iv)
PCT/IB/304	NOTIFICATION CONCERNING SUBMISSION OF PRIORITY DOCUMENT	Rule 17.1(c) and Administrative Instructions, Section 411
PCT/IB/305	NOTIFICATION OF LATE SUBMISSION OF APPLICATION NUMBER OF EARLIER APPLICATION	Rule 4.10(c)
PCT/IB/306	NOTIFICATION OF THE RECORDING OF A CHANGE IN THE PERSON, NAME, OR ADDRESS OF APPLICANT	Rules 18.5 or 54.4 and Administrative Instructions, Section 306
PCT/IB/307	NOTIFICATION OF WITHDRAWAL BY APPLICANT	Rule 32.1(d)
PCT/IB/308	NOTIFICATION INFORMING THE APPLICANT OF THE COMMUNICATION OF THE INTERNATIONAL APPLICATION TO THE DESIGNATED OFFICES	Rule 47.1(c)
PCT/IB/309	INVITATION TO PAY FOR REQUESTED COPIES OF DOCUMENTS IN FILE	Rule 94.1
PCT/IB/310	NOTIFICATION CONCERNING DOCUMENTS TRANSMITTED	Articles 13(1),(2)(b), 20(1), 25(1)(a),(b), 36(3)(a), and Rules 17.2, 66.7, 23.1(b) and 62.1(b)
PCT/IB/311	REQUEST FOR COPY OF TRANSLATION	Rule 95.1(a)
PCT/IB/312	NOTIFICATION OF TRANSMITTAL OF REQUESTED COPIES OF TRANSLATIONS	Rule 95.1(b)
PCT/IB/313	NOTIFICATION OF CERTAIN DEFECTS IN THE INTERNATIONAL APPLICATION	Rule 28.1(a)
PCT/IB/314	INVITATION TO REQUEST RECTIFICATION	Rule 91.1(d), second sentence
PCT/IB/315	NOTIFICATION OF DECISION CONCERNING REQUEST FOR RECTIFICATION	Administrative Instructions, Section 109
PCT/IB/316	INVITATION TO CORRECT PRIORITY DATE	Rule 4.10(d)
PCT/IB/317	NOTIFICATION OF CORRECTION OR CANCELLATION OF PRIORITY CLAIM	Rule 4.10(d) and Administrative Instructions, Section 402
PCT/IB/318	NOTIFICATION THAT PRIORITY CLAIM CONSIDERED NOT TO HAVE BEEN MADE	Rule 4.10(b) and Administrative Instructions, Section 409
PCT/IB/319	NOTIFICATION OF POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY	Rules 90.3(b) and 90.4(b)
PCT/IB/320	NOTIFICATION OF DEFECTIVE POWER OF ATTORNEY OR DEFECTIVE REVOCATION OF POWER OF ATTORNEY	Rules 90.3(c) and 90.4(b)

Form Identification Number:	Title of Form:	Provisions pursuant to which Form is issued:
PCT/IB/321	NOTIFICATION OF FACTS WHICH SHOULD HAVE PRECLUDED THE ACCORDING OF AN INTERNATIONAL FILING DATE	Rule 29.3
PCT/IB/322	NOTIFICATION OF TRANSMITTAL OF REQUESTED COPIES OF CITED DOCUMENTS	Articles 20(3) or 36(4)
PCT/IB/323	REQUEST FOR THE PRODUCTION OF PROOF	Rule 83
PCT/IB/324	NOTIFICATION OF DESIGNATIONS CONSIDERED TO BE WITHDRAWN	Rule 29.1(b)
PCT/IB/325	NOTIFICATION THAT INTERNATIONAL APPLICATION CONSIDERED TO BE WITHDRAWN BY RECEIVING OFFICE	Rule 29.1(a)(ii)
PCT/IB/326	NOTIFICATION THAT INTERNATIONAL APPLICATION CONSIDERED TO BE WITHDRAWN BY THE INTERNATIONAL BUREAU	Rule 24.2(b)
PCT/IB/327	NOTIFICATION OF TRANSMITTAL OF REQUESTED COPIES OF DOCUMENTS IN FILE	Rule 94.1
PCT/IB/328	LATER ELECTION OF STATES	Article 31(4)(a),(6)(b) and Rule 56
PCT/IB/329	NOTIFICATION OF RECEIPT OF LATER ELECTIONS	Rule 61.1(c)
PCT/IB/330	NOTIFICATION CONCERNING PAYMENT OF SUPPLEMENT TO THE HANDLING FEE	Rule 57.2(b)
PCT/IB/331	NOTIFICATION OF ELECTION	Rule 61.2
PCT/IB/332	INFORMATION CONCERNING ELECTED OFFICES NOTIFIED OF THEIR ELECTION	Rule 61.3
PCT/IB/333	INVITATION TO CORRECT DEFECTS IN THE LATER ELECTION OF STATES	Rule 60.2
PCT/IB/334	NOTIFICATION THAT LATER ELECTIONS CONSIDERED AS NOT HAVING BEEN SUBMITTED	Rule 61.1(c)
PCT/IB/335	NOTIFICATION OF ATTEMPTED ELECTIONS	Rule 60.3
PCT/IB/336	NOTIFICATION OF DEFECTS IN DEMAND	Rule 60.1(d)
PCT/IB/337	NOTIFICATION CONCERNING AMENDMENTS OF THE CLAIMS	Rule 62.2
PCT/IB/338	NOTIFICATION OF TRANSMITTAL OF COPIES OF TRANSLATIONS	Rule 72.2
PCT/IB/339	NOTIFICATION OF WITHDRAWAL BY APPLICANT UNDER CHAPTER II OF THE PCT	Rules 75.2 and 75.3
PCT/IB/340	INVITATION TO PAY FOR REQUESTED COPIES OF TRANSLATIONS	Rule 95.1(b)
PCT/IB/341	INVITATION TO PAY FOR REQUESTED COPIES OF CITED DOCUMENTS	Articles 20(3) and Rule 44.3 or Article 36(4) and Rule 71.2
PCT/IB/342	REQUEST FOR THE RECORDING OF CHANGE IN THE PERSON, NAME, OR ADDRESS OF INVENTOR	
PCT/IB/343	REQUEST FOR THE RECORDING OF CHANGE IN THE NAME OR ADDRESS OF AGENT OR COMMON REPRESENTATIVE	
PCT/IB/344	NOTIFICATION OF LACK OF SIGNATURE WITH REGARD TO CORRESPONDENCE SUBMITTED BY APPLICANT	Rules 92.1(a) and 92.1(b)
PCT/IB/345	COMMUNICATION TO THE APPLICANT IN CASES FOR WHICH NO OTHER FORM IS APPLICABLE	

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IV. FORMS TO BE EMPLOYED BY THE INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

Form Identification Number:	Title of Form:	Provisions pursuant to which Form is issued:
PCT/IPEA/401*	DEMAND	Article 31
PCT/IPEA/402	NOTIFICATION OF RECEIPT OF DEMAND	Rule 61.1(b), first sentance
PCT/IPEA/403	NOTIFICATION CONCERNING PAYMENT OF THE PRELIMINARY EXAMINATION AND HANDLING FEES	Rules 57 and 58
PCT/IPEA/404	INVITATION TO CORRECT DEFECTS IN DEMAND	Rule 60.1(a)
PCT/IPEA/405	INVITATION TO RESTRICT OR PAY ADDITIONAL FEES	Article 34(3)(a) and Rule 68.2
PCT/IPEA/406	INVITATION TO COMPLY WITH REQUIREMENTS FOR SUBMISSION OF A TRANSLATION OF THE INTERNATIONAL APPLICATION	Rule 55.2
PCT/IPEA/407	NOTIFICATION THAT DEMAND CONSIDERED AS NOT HAVING BEEN SUBMITTED	Rules 55.2(d), 57.4(c) and 60.1(c)
PCT/IPEA/408	WRITTEN OPINION	Rules 66.2(a),(b) and 66.4(a)
PCT/IPEA/409*	INTERNATIONAL PRELIMINARY EXAMINATION REPORT	Article 35(1) and Rule 70
PCT/IPEA/410	REQUEST FOR THE PRODUCTION OF PROOF	Rule 83
PCT/IPEA/411	INVITATION TO REQUEST RECTIFICATION	Rule 91.1(d), second sentence
PCT/IPEA/412	NOTIFICATION CONCERNING REQUEST FOR RECTIFICATION	Administrative Instructions, Section 109
PCT/IPEA/413	NOTIFICATION OF TRANSMITTAL OF REQUESTED COPIES OF DOCUMENTS IN FILE	Rule 94.1
PCT/IPEA/414	INVITATION TO FURNISH COPY OF PRIORITY DOCUMENT AND TRANSLATION	Rule 66.7(a),(b)
PCT/IPEA/415	NOTIFICATION CONCERNING DOCUMENTS TRANSMITTED	Rules 61.1(a), 71.1 and 71.2(c)
PCT/IPEA/416	NOTIFICATION OF TRANSMITTAL OF INTERNATIONAL PRELIMINARY EXAMINATION REPORT	Rule 71.1
PCT/IPEA/417	NOTIFICATION OF TRANSMITTAL OF REQUESTED COPIES OF CITED DOCUMENTS	Article 36(4)
PCT/IPEA/418	NOTIFICATION THAT APPLICANT IS NOT ENTITLED TO MAKE A DEMAND FOR INTERNATIONAL PRELIMINARY EXAMINATION	Rules 54.1, 54.2 and Administrative Instructions, Section 601(a)
PCT/IPEA/419	NOTIFICATION THAT APPLICANT IS NOT ENTITLED TO ELECT CERTAIN STATES	Rule 54.3 and Administrative Instructions, Section 601(b)
PCT/IPEA/420	NOTIFICATION OF DECISION ON PROTEST	Rule 68.3(c) and Administrative Instructions, Section 603
PCT/IPEA/421	INVITATION TO PAY FOR REQUESTED COPIES OF CITED DOCUMENTS	Rule 71.2(b)
PCT/IPEA/422	INVITATION TO PAY FOR REQUESTED COPIES OF DOCUMENTS IN FILE	Rule 94.1
PCT/IPEA/423	NOTIFICATION OF LACK OF SIGNATURE WITH REGARD TO CORRESPONDENCE SUBMITTED BY APPLICANT	Rules 92.1(a) and 92.1(b)
PCT/IPEA/424	COMMUNICATION TO THE APPLICANT IN CASES FOR WHICH NO OTHER FORM IS APPLICABLE	

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* Printed Form

INTERNATIONAL APPLICATION UNDER THE PATENT COOPERATION TREATY

REQUEST

THE UNDERSIGNED REQUESTS THAT THE PRESENT INTERNATIONAL APPLICATION BE PROCESSED ACCORDING TO THE PATENT COOPERATION TREATY

(The following is to be filled in by the Receiving Office)
INTERNATIONAL APPLICATION No:

INTERNATIONAL FILING DATE:

(Stamp)
Name of Receiving Office and "PCT International Application"

Applicant's or Agent's File No. [9] (indicated by applicant if desired).

I. TITLE OF INVENTION [1]

II. APPLICANT [2] Additional information is contained in supplemental box. ☐

Name [3, 5]

Address [4, 5] (including postal code and country)

Nationality [6] (country) | Residence [7] (country)

Telephone number (if any) | Telegraphic address (if any) | Teletype address (if any)

III. INVENTOR [8] (Applicant is also the inventor ☐) Additional information is contained in supplemental box. ☐

Name [3, 5]

Address [4, 5] (including postal code and country).

IV. AGENT OR COMMON REPRESENTATIVE (IF ANY) [9] Additional information is contained in supplemental box. ☐

A. ☐ Applicant hereby appoints the following named agent or common representative to act on his behalf before the competent authorities. [9]

B. ☐ Applicant has appointed the following named agent or common representative in accompanying separate power of attorney. [9]

Name [3, 5]

Address [4, 5] (including postal code and country).

Telephone number (if any) | Telegraphic address (if any) | Teletype address (if any)

V. DESIGNATION OF STATES [10] (and possible indication of wish to obtain regional patents) [11] (and possible choice of certain kinds of protection) [12] Additional information is contained in supplemental box. ☐

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Form PCT/RO/101 (first sheet) (August 1976) See notes on accompanying sheet

Sheet II

VI. PRIORITY CLAIM (IF ANY) [15] Additional information is contained in supplemental box. ☐

The priority of an earlier application is claimed (indicate following data):

Country (If the earlier application is regional or international application, indicate those countries [15] in which it was filed).	Filing Date [14]
	Application Number [15]
	If a regional or international application, indicate the national Office or intergovernmental organization with which it was filed.

VII. PARENT APPLICATION OR GRANT (IF ANY) [16] Additional information is contained in supplemental box. ☐

Designated State	Title of Treatment Desired	Title and Number of the Parent Application or Grant	Date of the Parent Application or Grant [14]

VIII. EARLIER INTERNATIONAL OR INTERNATIONAL-TYPE SEARCH (IF ANY) [17] Additional information is contained in supplemental box. ☐

An earlier ☐ (international) or ☐ (international-type) search has been requested on the following application:

Receiving Office/Country	(International) Application No.	(International) Filing Date [14]

Date of Request for the Search where the Earlier Search was an International-Type Search [14]	Number given by the International Searching Authority to the Request for Search where the Earlier Search was an International-Type Search

IX. DIFFERENT APPLICANTS FOR DIFFERENT (GROUPS OF) DESIGNATED STATES (WHERE APPLICABLE) [18] Additional information is contained in supplemental box. ☐

Designated States	Name of Applicant

X. DIFFERENT INVENTORS FOR DIFFERENT (GROUPS OF) DESIGNATED STATES (WHERE APPLICABLE) [19] Additional information is contained in supplemental box. ☐

Designated States	Name of Inventor

Sheet III

SUPPLEMENTAL BOX... USE THIS BOX IF ANY OF THE BOXES IS NOT LARGE ENOUGH TO CONTAIN INFORMATION TO BE FURNISHED. INDICATE THE BOXES CONTINUED IN THIS BOX BY THEIR (ROMAN) NUMERALS AND TITLE (e.g.: "II. APPLICANT (CONTINUED)")

XI. SIGNATURE OF APPLICANT [1]

XII. CHECK LIST ☐ (To be filled in by the Applicant) [2]

A. This international application contains the following number of sheets:

1. request	_____	sheets
2. description	_____	sheets
3. claims	_____	sheets
4. drawings	_____	sheets
5. abstract	_____	sheets
Total	_____	sheets

C. Figure number _____ of the drawings (if any) is suggested to accompany the abstract for publication.

D. Drawings (To be filled in by the Receiving Office)
☐ No Drawings [3]

B. This international application as filed is accompanied by the items checked below:

1. ☐ separate signed power of attorney
2. ☐ priority document
3. ☐ receipt (e.g. revenue stamps) for the fees paid
4. ☐ check for the payment of fees
5. ☐ international search report
6. ☐ international-type search report
7. ☐ document in evidence of fact that applicant is successor in title of inventor
8. ☐ other (specify)

(The following is to be filled in by the Receiving Office)

1. Date of actual receipt of the purported international application:

2. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:

3. Date of timely receipt of the required corrections under Article 11 of the PCT:

(The following is to be filled in by the International Bureau)

Date of receipt of the record copy:

Form PCT/RO/101 (last sheet) (August 1978) See notes on accompanying sheet

NOTES TO FORM PCT/RO/101

These Notes are intended to facilitate the filling in of the present form. For full information, see the text of the Patent Cooperation Treaty and the texts of the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and the said texts, the latter are applicable. "Article" refers to Articles of the Treaty, "Rule" refers to Rules of the Regulations and "Section" refers to Sections of the Administrative Instructions.

1 Title of Invention (Rule 4.1 *(a)* (ii))

"The title of the invention shall be short (preferably from two to seven words when in English or translated into English) and precise." (Rule 4.3)

2 Applicant (Rule 4.1 *(a)* (iii))

"The request shall indicate the name, address, nationality and residence of the applicant or, if there are several applicants, of each of them." (Rule 4.5 *(a)*)
"Where any international application indicates as applicants several persons, it shall be sufficient, for the purpose of identifying that application, to indicate, in any Form or correspondence relating to such application, the name of the applicant first named in the request." (Section 105)
See also box IX of the present form.

3 "Names of natural persons shall be indicated by the person's family name and given name(s), the family name being indicated before the given name(s)." (Rule 4.4 *(a)*)
"Names of legal entities shall be indicated by their full, official designations." (Rule 4.4 *(b)*)

4 "Addresses shall be indicated in such a way as to satisfy the customary requirements for prompt postal delivery at the indicated address and, in any case, shall consist of all the relevant administrative units up to, and including, the house number, if any. Where the national law of the designated State does not require the indication of the house number, failure to indicate such number shall have no effect in that State. It is recommended to indicate any telegraphic and teletype address and telephone number." (Rule 4.4 *(c)*)
"For each applicant, inventor, or agent, only one address may be indicated." (Rule 4.4 *(d)*)

5 "Where any name or address is written in characters other than those of the Latin alphabet, the same shall also be indicated in characters of the Latin alphabet either as a mere transliteration or through translation into English. The applicant shall decide which words will be merely transliterated and which words will be so translated." (Rule 4.16 *(a)*)
"The name of any country written in characters other than those of the Latin alphabet shall also be indicated in English." (Rule 4.16 *(b)*)

6 "The applicant's nationality shall be indicated by the name of the State of which he is a national." (Rule 4.5 *(b)*)
See Section 202 in Note 10 below.

7 "The applicant's residence shall be indicated by the name of the State of which he is a resident." (Rule 4.5 *(c)*)
See Section 202 in Note 10 below.

8 Inventor (Rules 4.1 *(a)* *(v)* and 4.6 *(a)*)

"If the applicant is the inventor, the request, ...shall contain a statement to that effect or shall repeat the applicant's name in the space reserved for indicating the inventor." (Rule 4.6 *(b)*)
See also box X of the present form.

9 Agent or Common Representative (Rules 4.1 *(a)* (iii), 4.7 and 4.8)

"If agents are designated, the request shall so indicate, and shall state their names and addresses." (Rule 4.7)
"If there is more than one applicant and the request does not refer to an agent representing all the applicants ("a common agent"), the request shall designate one of the applicants who is entitled to file an international application according to Article 9 as their common representative." (Rule 4.8 *(a)*)
"Appointment of any agent or of any common representative within the meaning of Rule 4.8 *(a)*, if the said agent or common representative is not designated in the request signed by all applicants, shall be effected in a separate signed power of attorney (i.e., a document appointing an agent or a common representative)." (Rule 90.3 *(a)*)
"The power of attorney may be submitted to the receiving Office or the International Bureau. Whichever of the two is the recipient of the power of attorney submitted shall immediately notify the other and the interested International Searching Authority and the interested International Preliminary Examining Authority." (Rule 90.3 *(b)*)
"If the separate power of attorney is not signed as provided in paragraph *(a)*, or if the required separate power of attorney is missing, or if the indication of the name or address of the appointed person does not comply with Rule 4.4, the power of attorney shall be considered non-existent unless the defect is corrected." (Rule 90.3 *(c)*)
For Rule 4.4 see Notes 3 and 4.

"Any correspondence from an International Authority intended for the applicant, or, in the case of several applicants, the applicants, shall be addressed as follows:"
"Where the applicant has designated or appointed one agent, correspondence shall be addressed to that agent. Where, in the case of several applicants, the applicants are represented by a common representative or a common agent, correspondence shall be addressed to that representative or that agent." (Section 108 *(a)* (i))
"Where the applicant has designated several agents in the request, correspondence shall be addressed to the agent first mentioned therein. Where, in the case of several applicants, the applicants have designated several common agents in the request, correspondence shall be addressed to the common agent first mentioned therein." (Section 108 *(a)* (ii))
"Where the applicant has appointed several agents in one or more separate powers of attorney, correspondence shall be addressed to the agent first mentioned in the earliest filed and still valid separate power of attorney. Where, in the case of several applicants, the applicants have appointed several common agents in one or more separate powers of attorney, correspondence shall be addressed to the common agent first mentioned in the earliest filed and still valid separate power of attorney." (Section 108 *(a)* (iii))
"Any correspondence from an International Authority to the applicant or his agent shall be marked with the file number of the applicant or the agent, if available, provided it does not exceed ten digits." (Section 108 *(b)*)
"In the case of several applicants, any agent designated under Rule 4.7 in the request signed by all the applicants, or appointed under Rule 90.3 in a separate power of attorney signed by all the applicants, shall be considered a common agent." (Section 106)
"If there are several agents appointed by the same applicant or applicants, any act by or in relation to any of the several agents shall have the effect of an act by or in relation to the said applicant or applicants." (Rule 90.2 *(c)*)
"If the applicants designate a common representative in accordance with Rule 4.8 *(a)*, such common representative shall be indicated on the front page of the request form. The indication of the common representative shall take the form of a statement designating the named applicant to act as the common representative on behalf of all the applicants." (Section 207)

10 Designation of States (Rule 4.1 *(a)* (iv))

"Contracting States shall be designated in the request by their names." (Rule 4.9)
"The name of any State referred to in the request shall be indicated either by the full name of the State or by a generally accepted short title which, if the indications are in English or French, shall be as appearing in *Annex A*. The receiving Office, or the International Bureau where the receiving Office fails to do so, shall insert, in the appropriate space provided for in the request form, the two-letter country code as appearing in *Annex B* (for example, "Argentine Republic (AR)" or "Argentina (AR)"." (Section 202 *(a)*)
"The receiving Office shall cancel *ex-officio* the designation of States other than Contracting States, and inform the applicant promptly of such action." (Section 202 *(b)*)
"If the applicant specifies the States to which he wishes any amount paid to be applied as designation fee, the amount shall be applied accordingly to the number of States which are covered by the amount in the order specified by the applicant." (Rule 15.5 *(a)*)
"If the applicant does not specify any such wish and if the amount or amounts received by the receiving Office are higher than the basic fee and one designation fee but lower than what is due according to the number of the designated States, any amount in excess of the basic fee and one designation fee shall be treated as designation fees for the States following the State first named in the request and in the order in which the States are designated in the request up to and including that designated State for which the total amount of the designation fee is covered by the amount or amounts received." (Rule 15.5 *(b)*)
"The designation fee for the first mentioned State belonging to a group of States for which the same regional patent is sought and which is specified under paragraph *(a)* or which is reached under paragraph *(b)* shall, for the purposes of the said paragraphs, be considered as covering also the other States of the said group." (Rule 15.5 *(c)*)

11 "The request shall, where applicable, contain: ...(iv) an indication that the applicant wishes to obtain a regional patent and the names of the designated States for which he wishes to obtain such a patent." (Rule 4.1 *(b)* (iv))
"Where the applicant wishes to obtain a regional patent in respect of any designated State, he shall make the indication in the request referred to in Rule 4.1 *(b)* (iv) by inserting the words "regional patent", or their equivalent in the language of the international application, immediately after the indication of the said State, provided that:

(i) where Article 4 (1) (ii), third clause applies, and not all the States party to the regional treaty have been designated, the international application shall be treated as if all those States had been designated and as if the designations of all such States contained the said words, whether the said designations contained an indication of the wish to obtain a regional patent or, according to Article 4 (1) (ii), fourth clause, are to be treated as containing such indication;

(ii) where the national law of any designated State contains a provision as referred to in Article 45 (2), the International Bureau shall, according to Article 4 (1) (ii), fourth clause, treat the designation as if it contained the said words even where the applicant failed to indicate them." (Section 204)

12 "In respect of any designated or elected State whose law provides for the grant of inventors' certificates, utility certificates, utility models, patents or certificates of addition, inventors' certificates of addition, or utility certificates of addition, the applicant may indicate, as prescribed in the Regulations, that his international application is for the grant, as far as that State is concerned, of an inventor's certificate, a utility certificate, or a utility model, rather than a patent, or that it is for the grant of a patent or certificate of addition, an inventor's certificate of addition, or a utility certificate of addition, and the ensuing effect shall be governed by the applicant's choice. For the purposes of this Article and any Rule thereunder, Article 2 (ii) shall not apply." (Article 43)

"If the applicant wishes his international application to be treated, in any designated State, as an application not for a patent but for the grant of any of the other kinds of protection specified in Article 43, he shall so indicate in the request. For the purposes of this paragraph, Article 2 (ii) shall not apply." (Rule 4.12 *(a)*)

"Where the applicant wishes his application to be treated in any designated State as an application not for a patent but for the grant of another kind of protection referred to in Article 43, he shall make the indication in the request referred to in Rule 4.12 *(a)* by inserting the words "inventor's certificate", "utility certificate", "utility model", "patent of addition", "certificate of addition", "inventor's certificate of addition" or "utility certificate of addition", or their equivalent in the language of the international application, immediately after the indication of the said State." (Section 203 *(a)*)

"In respect of any designated or elected State whose law permits an application, while being for the grant of a patent or one of the other kinds of protection referred to in Article 43, to be also for the grant of another of the said kinds of protection, the applicant may indicate, as prescribed in the Regulations, the two kinds of protection he is seeking, and the ensuing effect shall be governed by the applicant's indications. For the purposes of this Article, Article 2 (ii) shall not apply." (Article 44)

"Where the applicant is seeking two kinds of protection under Article 44, he shall make the indication in the request referred to in Rule 4.12 *(b)* by inserting, in the appropriate space provided for in the request form and in the language of the international application, either

(i) any two of the following terms connected by the word "and": "patent", "inventor's certificate", "utility certificate", "utility model", "patent of addition", "certificate of addition", "inventor's certificate of addition", "utility certificate of addition"; or

(ii) any two of the terms indicated in (i), above, one of them preceded by the word "primarily" and the other by the word "subsidiarily"." (Section 203 *(b)*)

13 **Priority Claim** (Rules 4.1 *(b)* (i) and 4.10)

14 "Any date in the international application shall be indicated by the Arabic number of the day, by the name of the month, and by the Arabic number of the year. The receiving Office, or the International Bureau where the receiving Office fails to do so, shall, after or below any date indicated by the applicant in the request, repeat the date, in parenthesis, by indicating it by two-digit Arabic numerals each for the number of the day, for the number of the month and for the last two numbers of the year, in that order and with a period after the digit pairs of the day and of the month (for example, "30 March 1972 (30.03.72)")." (Section 201)

15 " ...when the earlier application is not a regional or an international application, the country in which it was filed; when the earlier application is a regional or an international application, at least one country for which it was filed, ..." (Rule 4.10 *(b)* (i))

"If the application number of the earlier application is not indicated in the request but is furnished by the applicant to the International Bureau prior to the expiration of the 16th month from the priority date, it shall be considered by all designated States to have been furnished in time. If it is furnished after the expiration of that time limit, the International Bureau shall inform the applicant and the designated Offices of the date on which the said number was furnished to it." (Rule 4.10 *(c)*)

16 **Parent Application or Grant** (Rule 4.1 *(b)* (v))

"If the applicant wishes his international application to be treated, in any designated State, as an application for a patent or certificate of addition, inventor's certificate of addition, or utility certificate of addition, he shall identify the parent application or the parent patent, parent inventor's certificate, or parent utility certificate to which the patent or certificate of addition, inventor's certificate of addition, or utility certificate of addition, if granted, relates. For the purposes of this paragraph, Article 2 (ii) shall not apply." (Rule 4.13)

"If the applicant wishes his international application to be treated, in any designated State, as an application for a continuation or a continuation-in-part of an earlier application, he shall so indicate in the request and shall identify the parent application involved." (Rule 4.14)

17 **Earlier International or International-Type Search** (Rule 4.1 *(b)* (ii))

"If an international or international-type search has been requested on an application under Article 15 (5), the request may state that fact and identify the application (or its translation, as the case may be) by country, date and number, and the request for the said search by date and, if available, number." (Rule 4.11)

18 **Different Applicants for Different (Groups of) Designated States** (Rule 18.4)

"The international application may indicate different applicants for the purposes of different designated States, provided that, in respect of each designated State, at least one of the applicants indicated for the purposes of that State is entitled to file an international application according to Article 9." (Rule 18.4 *(a)*)

19 **Different Inventors for Different (Groups of) Designated States** (Rule 4.6 *(c)*)

"The request may, for different designated States, indicate different persons as inventors where, in this respect, the requirements of the national laws of the designated States are not the same. In such a case, the request shall contain a separate statement for each designated State or group of States in which a particular person, or the same person, is to be considered the inventor, or in which particular persons, or the same persons, are to be considered the inventors." (Rule 4.6 *(c)*)

20 **Signature** (Rule 4.1 *(d)*)

The signature must be that of the applicant and if there are several applicants all must sign (Rule 4.15); however, the signature may be that of the agent (Rule 2.1) where there is attached to this request a separate power of attorney appointing the agent. "Appointment of any agent or of any common representative within the meaning of Rule 4.8 *(a)*, if the said agent or common representative is not designated in the request signed by all applicants, shall be effected in a separate signed power of attorney (i.e., a document appointing an agent or a common representative)." (Rule 90.3 *(a)*)

21 **Check List** (Rule 3.3)

"*(a)* The printed form shall contain a list which, when filled in, will show:

(i) the total number of sheets constituting the international application and the number of the sheets of each element of the international application (request, description, claims, drawings, abstract);

(ii) whether or not the international application as filed is accompanied by a power of attorney (i.e., a document appointing an agent or a common representative), a priority document, a receipt for the fees paid or a check for the payment of the fees, an international or an international-type search report, a document in evidence of the fact that the applicant is the successor in title of the inventor, and any other document (to be specified in the check list);

(iii) the number of that figure of the drawings which the applicant suggests should accompany the abstract when the abstract is published on the front page of the pamphlet and in the Gazette; in exceptional cases, the applicant may suggest more than one figure.

(b) The list shall be filled in by the applicant, failing which the receiving Office shall fill it in and make the necessary annotations, except that the number referred to in paragraph *(a)* (iii) shall not be filled in by the receiving Office." (Rule 3.3)

22 **Missing Drawings** (Rule 26.6)

"*(a)* If, as provided in Article 14(2), the international application refers to drawings which in fact are not included in that application, the receiving Office shall so indicate in the said application." (Rule 26.6 *(a)*)

"Where the international application refers to drawings which in fact are not included in that application, the receiving Office shall make the indication referred to in Rule 26.6 *(a)* by an appropriate marking of the request form." (Section 310 *(a)*)

THIS SHEET IS NOT PART OF THE INTERNATIONAL APPLICATION

This column for use by Receiving Office

FEE CALCULATION SHEET [1]

I. TRANSMITTAL FEE [2] ..... T

II. SEARCH FEE [3] ..... S

III. INTERNATIONAL FEE [4]

BASIC FEE [5]

Indicate the number of SHEETS contained in the international application _____.

If the international application contains not more than 30 sheets ..... $45.00 b_1

If the international application contains more than 30 sheets, add $1.00 for each sheet in excess of 30 ..... b_2

Add amounts entered in boxes b_1 and b_2, and enter total in box B. This figure is the amount of the BASIC FEE ..... B

DESIGNATION FEES [6]

Indicate the number of DESIGNATED STATES for which regional patents have not been sought _____.

Multiply the number of these which require transmittal of a copy of the international application [7] _____ by $14.00. ..... d_1

Multiply the number of these which do NOT require transmittal of a copy of the international application [8] _____ by $12.00. ..... d_2

Indicate the number of GROUPS of Designated States for which regional patents have been sought _____.

Multiply the number of these which require transmittal of a copy of the international application [7] _____ by $14.00 ..... d_3

Multiply the number of these which do NOT require transmittal of a copy of the international application [8] _____ by $12.00. ..... d_4

Add amounts entered in boxes d_1, d_2, d_3 and d_4, and enter total in box D. This figure is the amount of the DESIGNATION FEES ..... D

Add amounts entered in boxes B and D, and enter total in box I. This figure is the amount of the INTERNATIONAL FEE. I

IV. TOTAL OF PRESCRIBED FEES:

Add amounts entered in boxes T, S and I, and enter total in the total box. This figure is the total amount of the PRESCRIBED FEES. ..... TOTAL

THE APPLICANT MAY PAY THE PRESCRIBED FEES BY [CHEQUE, POSTAL MONEY ORDER, BANK DRAFT, CASH, REVENUE STAMPS, DEBITING DEPOSIT ACCOUNT NO. ....., COUPONS, ETC.]. PAYMENT SHOULD BE MADE IN THE PRESCRIBED CURRENCY TO THE [ACCOUNT OF, ACCOUNT INDICATED BELOW OF, ORDER OF] THE RECEIVING OFFICE.

Form PCT/RO/101 (Annex) (August 1976)

See notes on reverse side

NOTES TO FORM PCT/RO/101 (ANNEX)

1 The purpose of the fee calculation sheet is to aid the applicant to identify the prescribed fees and to calculate the amounts to be paid. It is strongly recommended that the applicant complete by entering the appropriate amounts in the boxes provided and submit the fee calculation sheet at the time of filing of the international application. This will help the receiving Office to verify the calculations and to identify any error in them.

2 "Any receiving Office may require that the applicant pay a fee to it, for its own benefit, for receiving the international application, transmitting copies to the International Bureau and the competent International Searching Authority, and performing all the other tasks which it must perform in connection with the international application in its capacity of receiving Office ("transmittal fee")." (Rule 14.1 *(a)*)

"The amount and the due date of the transmittal fee, if any, shall be fixed by the receiving Office." (Rule 14.1 *(b)*)

3 "Each International Searching Authority may require that the applicant pay a fee ("search fee") for its own benefit for carrying out the international search and for performing all other tasks entrusted to International Searching Authorities by the Treaty and these Regulations." (Rule 16.1 *(a)*)

"The search fee shall be collected by the receiving Office. It shall be payable in the currency prescribed by that Office, it being understood that, if that currency is not the same as the currency of the State in which the International Searching Authority is located, the search fee, when transferred by the receiving Office to that Authority, shall be freely convertible into the currency of the said State. As to the time of payment of the search fee, Rule 15.4 *(a)* shall apply." (Rule 16.1 *(b)*)

4 "Each international application shall be subject to the payment of a fee for the benefit of the International Bureau ("international fee") consisting of:

(i) a "basic fee," and
(ii) as many "designation fees" as there are States designated in the international application, provided that, where a regional patent is sought for certain designated States, only one designation fee shall be due for those States." (Rule 15.1)

5 "The amount of the basic fee shall be:

(i) if the international application contains not more than 30 sheets: US $ 45.00 or 194 Swiss francs,
(ii) if the international application contains more than 30 sheets: US $ 45.00 or 194 Swiss francs plus US $ 1.00 or 4.30 Swiss francs per sheet in excess of 30 sheets." (Rule 15.2 *(a)*)

6 "The amount of the designation fee shall be:

(i) for each designated State or each group of designated States for which the same regional patent is sought which does not require the furnishing of a copy under Article 13: US $ 12.00 or 52 Swiss francs,
(ii) for each designated State or each group of designated States for which the same regional patent is sought which requires the furnishing of a copy under Article 13: US $ 14.00 or 60 Swiss francs." (Rule 15.2 *(b)*)

7 "Any designated Office may ask the International Bureau to transmit to it a copy of the international application prior to the communication provided for in Article 20, and the International Bureau shall transmit such copy to the designated Office as soon as possible after the expiration of one year from the priority date." (Article 13(1))

See Rule 15.2 *(b)* (ii) quoted in note (6) above.

The following designated Offices have asked the International Bureau to transmit to it a copy of the international application as soon as possible after the expiration of one year from the priority date: ...

The following designated Offices acting for groups of designated States have asked the International Bureau to transmit to them a copy of the international application as soon as possible after the expiration of one year from the priority date: ...

8 See Article 13 (1) quoted in note (7) above and Rule 15.2 *(b)* (i) quoted in note (6) above.

The following designated Offices do not require the International Bureau to transmit to them a copy of the international application as soon as possible after the expiration of one year from the priority date: ...

The following designated Offices acting for groups of designated States do not require the International Bureau to transmit to them a copy of the international application as soon as possible after the expiration of one year from the priority date: ...

PATENT COOPERATION TREATY
INTERNATIONAL SEARCH REPORT

IDENTIFICATION OF INTERNATIONAL APPLICATION | Applicant's or Agent's File No. [ba]

International Application No. [1] | International Filing Date [1]

Receiving Office [1] | Priority Date Claimed [1]

Applicant [1]

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [3]

According to International Patent Classification (IPC) or to both National Classification and IPC

II. FIELDS SEARCHED

Minimum Documentation Searched [4]

Classification System	Classification Symbols

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [5]

III. TITLE, ABSTRACT AND FIGURE OF DRAWING

1. The following indicated items are approved as submitted by the applicant: [6]
   ☐ Title. ☐ Abstract.
2. The texts established by this International Searching Authority of the following indicated items are set forth on a supplemental sheet: [6]
   ☐ Title. ☐ Abstract.
3. ☐ This report is incomplete as far as the abstract is concerned as the time limit for comments by the applicant on the draft prepared by this International Searching Authority has not expired. [7]
4. The figure of the drawings indicated below is to be published with the abstract: [8]
   ☐ Figure No._____as suggested by the applicant. [9]
   Figure No._____because:
   ☐ applicant failed to suggest a figure. [10]
   ☐ this figure better characterizes the invention. [10]

IV. ☐ **CERTAIN CLAIMS WERE FOUND UNSEARCHABLE** [11] (Observations on supplemental sheet)

V. ☐ **UNITY OF INVENTION IS LACKING** [12] (Observations on supplemental sheet)

Form PCT/ISA/210 (first sheet) (August 1978) See notes on accompanying sheet

Page ...

VI. DOCUMENTS CONSIDERED TO BE RELEVANT [16]

Category *	Citation of Document, [17] with indication, where appropriate, of the relevant passages [18]	Relevant to Claim No. [19]

* Categories of cited documents: [16]

"A" (document defining the general state of the art)

"E" (earlier document but published later than the international filing date)

"O" (document referring to an oral disclosure, use, exhibition or other means)

"P" (document published prior to the international filing date but later than the priority date claimed)

"T" (later document published after the international filing date or priority date and not in conflict with the application, but cited to understand the principle or theory underlying the invention)

"X" (document of particular relevance)

VII. CERTIFICATION

Date of the Actual Completion of the International Search [3]	Date of Mailing of this International Search Report [3]
International Searching Authority [1]	Signature of Authorized Officer [21]

Form PCT/ISA/210 (last sheet) (August 1976)

See notes on accompanying sheet

Page ...

III. ☐ TITLE, ABSTRACT •

This International Searching Authority has established the following text of the:

☐ Title.

☐ Abstract.

Form PCT/ISA/210 (supplemental sheet) (August 1976) See notes on accompanying sheet

IV. ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE [11]

This International Search Report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. ☐ Claim numbers ....., because they related to subject matter [12] not required to be searched by this Authority, namely:

2. ☐ Claim numbers ....., because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that a meaningful international search can be carried out [13], specifically:

V. ☐ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING [13]

This International Searching Authority found multiple inventions in this International Application as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims of the international application.

2. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims of the international application for which fees were paid specifically claims:

3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

Remark on Protest

☐ The additional search fees were accompanied by applicant's protest.

☐ No protest accompanied the payment of additional search fees.

NOTES TO FORM PCT/ISA/210

These Notes are intended to facilitate the use of the present form. For full information, see the text of the Patent Cooperation Treaty and the texts of the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and the said texts, the latter are applicable. "Article" refers to Articles of the Treaty, "Rule" refers to Rules of the Regulations and "Section" refers to Sections of the Administrative Instructions.

1 "The international search report shall identify the International Searching Authority which established it by indicating the name of such Authority, and the international application by indicating the international application number, the name of the applicant, the name of the receiving Office, and the international filing date." (Rule 43.1)

2 "The international search report shall be dated and shall indicate the date on which the international search was actually completed. It shall also indicate the filing date of any earlier application whose priority is claimed." (Rule 43.2)

3 "The international search report shall contain the classification of the subject matter at least according to the International Patent Classification." (Rule 43.3 *(a)*)
"Such classification shall be effected by the International Searching Authority." (Rule 43.3 *(b)*)
"Where the subject matter of the international application is such that classification thereof requires more than one classification symbol according to the principles to be followed in the application of the International Patent Classification to any given patent document, the international search report shall indicate all such symbols." (Section 504 *(a)*)
"Where any national classification system is used, the international search report may indicate all the applicable classification symbols also according to that system." (Section 504 *(b)*)
"Where the subject matter of the international application is classified both according to the International Patent Classification and to any national classification system, the international search report shall, wherever possible, indicate the corresponding symbols of both classifications opposite each other. "(Section 504 *(c)*)

4 "The international search report shall list the classification identification of the fields searched. If that identification is effected on the basis of a classification other than the International Patent Classification, the International Searching Authority shall publish the classification used." (Rule 43.6 *(a)*)

5 "If the international search extended to patents, inventors' certificates, utility certificates, utility models, patents or certificates of addition, inventors' certificates of addition, utility certificates of addition, or published applications for any of those kinds of protection, of States, periods, or languages, not included in the minimum documentation as defined in Rule 34, the international search report shall, when practicable, identify the kinds of documents, the States, the periods, and the languages to which it extended. For the purposes of this paragraph, Article 2 (ii) shall not apply." (Rule 43.6 *(b)*)

6 "Subject to paragraphs *(b)* and *(c)*, the international search report shall either state that the International Searching Authority approves the title and the abstract as submitted by the applicant or be accompanied by the text of the title and/or abstract as established by the International Searching Authority under Rules 37 and 38." (Rule 44.2 *(a)*)

7 "If, at the time the international search is completed, the time limit allowed for the applicant to comment on any suggestion of the International Searching Authority in respect of the abstract has not expired, the international search report shall indicate that it is incomplete as far as the abstract is concerned". (Rule 44.2 *(b)*)

8 "Where it is the International Searching Authority which, under Rule 8.2, indicates the figure or figures of the drawings to be published with the abstract, that Authority shall notify the applicant and the International Bureau accordingly." (Section 507)

9 The figure suggested by the applicant is indicated in the check list of the request; see Rule 3.3 *(a)* (iii).

10 "If the applicant fails to make the indication referred to in Rule 3.3 *(a)* (iii), or if the International Searching Authority finds that a figure or figures other than that figure or those figures suggested by the applicant would among all the figures of all the drawings, better characterize the invention, it shall indicate the figure or figures which it so considers. Publications by the International Bureau shall then use the figure or figures so indicated by the International Searching Authority. Otherwise, the figure or figures suggested by the applicant shall be used in the said publications." (Rule 8.2)

11 This part of the report is filled in only where Article 17 (2) *(b)* applies. (Where certain claims were not searched because of lack of unity of invention and non-payment of additional fees, part V—rather than this part—is filled in.) Article 17 (2) reads as follows:

"*(a)* If the International Searching Authority considers
(i) that the international application relates to a subject matter which the International Searching Authority is not required, under the Regulations, to search, and in the particular case decides not to search, or
(ii) that the description, the claims, or the drawings, fail to comply with the prescribed requirements to such an extent that a meaningful search could not be carried out,
the said Authority shall so declare and shall notify the applicant and the International Bureau that no international search report will be established.
"*(b)* If any of the situations referred to in subparagraph *(a)* is found to exist in connection with certain claims only, the international search report shall so indicate in respect of such claims, whereas, for the other claims, the said report shall be established as provided in Article 18."

12 This part of the report is filled in only where, in the course of the procedure preceding the issuance of this report the International Searching Authority, having found that the international application does not comply with the requirement of unity of invention, invites the applicant to pay additional fees (see Article 17 (3) *(a)*)
"If the applicant paid additional fees for the international search, the international search report shall so indicate. Furthermore, where the international search was made on the main invention only (Article 17 (3) *(a)*), the international search report shall indicate what parts of the international application were and what parts were not searched." (Rule 43.7)

13 See Article 17 (2) *(a)* (i), quoted in note 11, above, and Rule 39 reading as follows:
"No International Searching Authority shall be required to search an international application if, and to the extent to which, its subject matter is any of the following:
(i) scientific and mathematical theories,
(ii) plant or animal varieties or essentially biological processes for the production of plants and animals, other than microbiological processes and the products of such processes,
(iii) schemes, rules or methods of doing business, performing purely mental acts or playing games,
(iv) methods for treatment of the human or animal body by surgery or therapy, as well as diagnostic methods,
(v) mere presentations of information,
(vi) computer programs to the extent that the International Searching Authority is not equipped to search prior art concerning such programs."

14 See Article 17 (2) *(a)* (ii), quoted in note 11, above.

15 "The objective of the international search is to discover relevant prior art." (Article 15 (2))
Rule 33.1, entitled "Relevant Prior Art for the International Search," reads as follows:
"*(a)* For the purposes of Article 15 (2), relevant prior art shall consist of everything which has been made available to the public anywhere in the world by means of written disclosure (including drawings and other illustrations) and which is capable of being of assistance in determining that the claimed invention is or is not new and that it does or does not involve an inventive step (i.e., that it is or is not obvious), provided that the making available to the public occurred prior to the international filing date.
"*(b)* When any written disclosure refers to an oral disclosure, use, exhibition, or other means whereby the contents of the written disclosure were made available to the public, and such making available to the public occurred on a date prior to the international filing date, the international search report shall separately mention that fact and the date on which it occurred if the making available to the public of the written disclosure occurred on a date posterior to the international filing date.
"*(c)* Any published application or any patent whose publication date is later but whose filing date, or, where applicable, claimed priority date, is earlier than the international filing date of the international application searched, and which would constitute relevant prior art for the purposes of Article 15 (2) had it been published prior to the international filing date, shall be specially mentioned in the international search report."

16 "Where any document cited in the international search report is of particular relevance, the special indication required by Rule 43.5 *(c)* shall consist of the letter "X" placed next to the citation of the said document." (Section 505)
"Where any document cited in the international search report refers to an oral disclosure, use, exhibition, or other means referred to in Rule 33.1 *(b)*, the separate indication required by that Rule shall consist of the letter "O" placed next to the citation of the said document." (Section 508 *(a)*)
"Where any document cited in the international search report is a published application or patent as defined in Rule 33.1 *(c)*, the special mention required by that Rule shall consist of the letter "E"

placed next to the citation of the said document." (Section 508 *(b)*)
"Where any document cited in the international search report is a document which defines the general state of the art, it shall be indicated by the letter "A" placed next to the citation of the said document." (Section 508 *(c)*)
"Where any document cited in the international search report is a document whose publication date occurred earlier than the international filing date of the international application, but later than the priority date claimed in that application, it shall be indicated by the letter "P" next to the citation of the said document." (Section 508 *(d)*)
"Where any document cited in the international search report is a document whose publication date occurred after the filing date or the priority date of the international application and is not in conflict with the said application, but is cited for the principle or theory underlying the invention, which may be useful for a better understanding of the invention, or is cited to show that the reasoning or the facts underlying the invention are incorrect, it shall be indicated by the letter "T" next to the citation of the document." (Section 508 *(e)*)

17 "The international search report shall contain the citations of the documents considered to be relevant." (Rule 43.5 *(a)*)
"Identification of any document cited in the international search report referred to in Rule 43.5 *(b)* shall be made by indicating the following elements in the order in which they are listed:

(a) *In the case of any patent document* (patent documents being patents within the meaning of Article 2 (ii) as well as published applications relating thereto)
- (i) the Office that issued the document, by the two-letter code as in *Annex B*;
- (ii) the kind of document, by the appropriate symbols as in *Annex C*;
- (iii) the number of the document as given to it by the Office that issued it; (for Japanese documents the indication of the year of the reign of the Emperor must precede the patent publication number);
- (iv) the date of publication as indicated on the patent document; and
- (v) where applicable, the pages, columns or lines where the relevant passages appear, or the relevant figures of the drawings.

(The following example illustrates the citation of a patent document according to paragraph (a) above:
JA, B, 5014535, published 1975, April 8, see column 2 lines 10 to 15.)

(b) *In the case of any book or other separately issued publication*
- (i) the name of the author;
- (ii) the title (including, where applicable, the number of the edition and/or volume);
- (iii) the year of publication (when this coincides with the year of the international application or of the priority claim, the International Searching Authority shall endeavour to determine the month and, if necessary, the day of publication and to indicate these data in the international search report);
- (iv) the name of the publisher;
- (v) as far as available, the place of publication (where only the location of the publisher appears on the book or other separately issued publication, then that location shall be indicated as the place of publication); and
- (vi) where applicable, the pages, columns or lines where the relevant passages appear, or the relevant figures of the drawings.

(The following example illustrates the citation of a book or other separately issued publication according to paragraph (b) above:
H. Walton, 'Microwave Quantum Theory', Volume 2, published 1973, April 4, by Sweet and Maxwell (London), see pages 138 to 192.)

(c) *In the case of any article published in a periodical or other serial publication*
- (i) the title of the periodical or other serial publication;
- (ii) the number of the volume and the date of the issue in which the article appears;
- (iii) as far as available, the place of publication (where only the location of the publisher appears in the periodical or other serial publication, then that location shall be indicated as the place of publication);
- (iv) the author and the title of the article and the number of the page both on which the article starts and ends; and
- (v) where applicable, the pages, columns or lines where the relevant passages appear, or the relevant figures of the drawings.

(The following example illustrates the citation of an article published in a periodical or other serial publication according to paragraph (c) above:
IBM Technical Disclosure Bulletin, Volume 17, no. 5, issued 1974 October (Armonk, New York), J. G. Drop, 'Integrated Circuit Personalization at the Module Level', see pages 1344 to 1345.)

(d) *In the case of abstracts*
- (i) the identification of the document containing the abstract in the manner set forth in paragraphs *(a)*, *(b)* and *(c)*, respectively, depending upon whether the abstract is contained in a patent document, in a book or other separately issued publication, or in an article published in a periodical or other serial publication;
- (ii) in the case where the abstract is not published together with the full text document which served as its basis, the identification of both abstract and full text document on the basis of whatever bibliographic data may be available in respect thereto."

(The following example illustrates the citation of an abstract according to paragraph *(d)* (ii) above:
Chemical Abstracts, Volume 75, no. 20, issued 1971, November 15 (Colombus, Ohio, U.S.A.), D. I. Shetulov, 'Surface Effects During Metal Fatigue' see page 163, column 1, the abstract no. 120718k, Fiz.-Khim. Mekh. Mater. 1971,7(2), 7-11 (Russ).) (Section 503)

18 "If only certain passages of the cited document are relevant or particularly relevant, they shall be identified, for example, by indicating the page, the column, or the lines, where the passage appears." (Rule 43.5 *(e)*)

19 "Citations which are not relevant to all the claims shall be cited in relation to the claim or claims to which they are relevant." (Rule 43.5 *(d)*)
"The claims to which cited documents are relevant shall be indicated by placing in the appropriate column of the international search report:
- (i) where the cited document is relevant to one claim, the number of that claim; for example, (2) or (17);
- (ii) where the cited document is relevant to two or more claims numbered in consecutive order, the numbers of the first and last claims of the series connected by a hyphen; for example, (1-15) or (2-3);
- (iii) where the cited document is relevant to one or more claims that are not numbered in consecutive order, the number of each claim placed in ascending order and separated by a comma or commas; for example, (1,6) or (1,7,10);
- (iv) where the cited document is relevant to more than one series of claims under (ii) above, or to claims of both categories (ii) and (iii) above, the series or individual claim numbers and series placed in ascending order using commas to separate the several series, or to separate the numbers of individual claims and each series of claims; for example, (1-6, 9-10, 12-15) or (1, 3-4, 6, 9-11)." (Section 509)

20 "Any correspondence from an International Authority to the applicant or his agent shall be marked with the file number of the applicant or the agent, if available, provided it does not exceed ten digits." (Section 108 *(b)*)

21 "The international search report shall be signed by an authorized officer of the International Searching Authority." (Rule 43.8)

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,610,869, P. R. Allison, FLEXIBLE HOSE END CONNECTION; **2,616,450,** Legge and Manning, PILOT CONTROLLED VALVES WITH PRESSURE SURGE RELIEF; **2,657,900,** C. H. Latimer-Needham, PISTON; **2,692,102,** Cobham, Latimer-Needham, Smith and Macgregor, APPARATUS FOR TOWING AND REFUELING AIRCRAFT IN FLIGHT; **2,692,103,** Cobham, Latimer-Needham and Macgregor, APPARATUS FOR TOWING AND REFUELING AIRCRAFT IN FLIGHT; **2,716,527,** C. H. Latimer-Needham, same; **2,728,590,** P. S. Macgregor, SELF-ENGAGING AND SELF-SEALING PIPE COUPLINGS, ESPECIALLY APPLICABLE TO FLIGHT REFUELING PURPOSES; **2,733,079,** R. F. Worlidge, same; **2,788,243,** Goodliffe and Macgregor, HOSE-REELS WITH MEANS FOR JETTISONING THE HOSE AND SEALING THE HOSE CONNECTION; **2,852,280,** R. F. Worlidge, SELF-ENGAGING AND SELF-SEALING PIPE COUPLINGS ESPECIALLY APPLICABLE TO FLIGHT REFUELING PURPOSES; **2,855,223,** P. S. Macgregor, same; **2,887,297,** Macgregor and Goodliffe, HOSE OR CABLE CARRYING WINCHES; **2,904,351,** Gellett and Macgregor, PIPE-COUPLING DEVICES; **2,905,407,** Macgregor and Goodliffe, DEVICE FOR RESILIENTLY ARRESTING THE MOVEMENT OF HOSE OR CABLE-CARRYING WINCHES; **2,953,332,** G. A. Conger, APPARATUS FOR FORMING SHAPED ARTICLES SUCH AS FOUNDRY MOLDS AND CORES; **2,978,168,** Goodliffe, Macgregor and Procter, APPARATUS FOR TRAILING A FLUID-TRANSMITTING HOSE OR TOW-LINE FROM AN AIRCRAFT, **filed** Apr. 28, 1976, in the United States Court of Claims, Doc. 169–76, *Flight Refueling Limited* v. *The United States.*

2,616,450. (See 2,610,869.)

2,657,900. (See 2,610,869.)

2,692,102. (See 2,610,869.)

2,692,103. (See 2,610,869.)

2,716,527. (See 2,610,869.)

2,728,590. (See 2,610,869.)

2,733,079. (See 2,610,869.)

2,788,243. (See 2,610,869.)

2,826,766, E. G. Rice, COMBINATION STOCKINGS AND PANTY; **3,675,247,** J. O. Ferrell, METHOD AND FABRICATING PANTY HOSE; **Re. 25,380,** E. G. Rice, COMBINATION STOCKINGS AND PANTY, **filed** Nov. 14, 1975, D.C., W.D.N.C. (Statesville), Doc. ST–C–75–52, *Tights Inc.* v. *Adams-Millis Corporation.* It is hereby ordered that this action be dismissed with prejudice, Apr. 15, 1976.

2,852,280. (See 2,610,869.)

2,855,223. (See 2,610,869.)

2,887,297. (See 2,610,869.)

2,904,351. (See 2,610,869.)

2,905,407. (See 2,610,869.)

2,928,211, I. Z. Martin, HYDROPONIC APPARATUS; **3,458,951,** same, HYDROCULTURE GRASS UNIT, **filed** Dec. 22, 1975, D.C. Ariz. (Phoenix), Doc. C–75–872–Phx, *S. A. Tombra* v. *Hydroculture Inc.* Stipulation and order of dismissal, June 7, 1976.

2,953,332. (See 2,610,869.)

2,961,777, Nevieel and Rosen, APPARATUS FOR THE STUDY AND TESTING PARTICIPANTS OF A STUDY PROBLEM AND A METHOD OF MAKING SAME; **2,986,820,** Neville and Malian, TECHNIQUE AND MEANS FOR RENDERING CERTAIN MATERIAL INVISIBLE; **3,055,117,** Bernstein, Grisewood, Valkenburgh, Dwight and Neville, ARTICLE AND METHOD FOR CONCEALING A RESPONSE OR ITEM OF INFORMATION, **filed** Feb. 10, 1976, D.C.N.J. (Trenton), Doc. 76–250, *System Operations Inc. and Mathematica Inc.* v. *Scientific Games Development Corp. and Dittler Brothers Inc.*

2,978,168. (See 2,610,869.)

2,986,820. (See 2,961,777.)

3,034,513, W. S. Ausherman, REVERSIBLE BAR FOR THRESHING CYLINDERS; **3,203,428,** same, THRESHING CYLINDER BAR; **3,256,887,** same, RASP BAR FOR A THRESHING CYLINDER; **3,297,037,** same, CONCAVE FOR THRESHING CYLINDERS, **filed** Apr. 12, 1976, D.C. Kans. (Topeka), Doc. 76–56–C5, *William S. Ausherman* v. *Lee K. Stump and Ausherman Manufacturing Company Inc.*

3,055,117. (See 2,961,777.)

3,203,428. (See 3,034,513.)

3,251,514, W. L. Speicher, LIQUID DISPENSING JUG HAVING A VENTED HANDLE; **D. 199,591,** same, JUG, **filed** July 13, 1976, D.C., M.D. Fla. (Jacksonville), Doc. 76–486–C–J–T, *The Clorox Company* v. *No-Glug Jug Corporation.*

3,256,887. (See 3,034,513.)

3,297,037. (See 3,034,513.)

3,306,261, C. A. Purdy, FEED DELIVERY METHOD AND APPARATUS; **3,522,876,** same, CONVEYOR SYSTEM, **filed** July 9, 1976, D.C., N.D. Ill. (Chicago), Doc. 76c2520, *Chester A. Purdy* v. *P & D Mfg. Company Inc.*

3,313,477, G. Brown, TRANSPARENT BANK CONSTRUCTION HAVING COIN SORTING MEANS, **filed** Nov. 12, 1970, D.C., N.D. Ill. (Chicago), Doc. 70c2830, *Grant Co.* v. *Syndicate Products Inc. et al.* Complaint dismissed without prejudice. Final judgment on consent entered, June 19, 1972.

3,326,468, Bristow and McCloud, TANK CLEANING MACHINE EMPLOYING A PISTON ACTUATED HYDRAULIC CLUTCH; **3,637,138,** J. H. Rucker, TANK CLEANING MACHINE, **filed** Aug. 13, 1976, D.C. Del. (Wilmington), Doc. 76–269, *Sybron Corporation and Cloud Company* v. *Rochem Ltd.*

3,338,369, W. E. Rexford, TYPEWRITER KEY OPERATED MECHANISM AND MOUNTING AND GUIDING STRUCTURE THEREFOR; **3,724,632,** S. Kuramochi, TYPEWRITER, **filed** Aug. 19, 1976, D.C., S.D.N.Y., Doc. 76–C–3703–EW, *Louis Marx & Company Inc.* v. *Buddy L. Corporation.*

3,369,518, C. J. Jacobson, AQUATIC VEHICLE; **3,623,447,** same, POWERED AQUATIC VEHICLE; **3,658,026,** same, MARINE VEHICLE STEERING ASSEMBLY; **D. 226,036,** same, JET PROPELLED AQUATIC VEHICLE, **filed** July 14, 1976, D.C., C.D. Calif. (Los Angeles), Doc. CV76–2239–MML, *Clayton Jacobson* v. *Kawasaki Motors Corp. et al.*

3,412,427, Flusfeder and Palmer, APPARATUS FOR MANUFACTURING DISC RECORDS; **3,702,749,** same, **filed** Aug. 8, 1974, D.C.N.J. (Newark), Doc. C–74–1215, *Lened Inc.* v. *Valley Metallurgical Processing Company Inc.* Stipulation of dismissal of action, Apr. 14, 1976.

3,458,951. (See 2,928,211.)

3,503,530, Burch and Bates, TRANSFER CART FOR TRANSFERRING AN ARTICLE HANDLING VEHICLE BETWEEN AISLES OF A WAREHOUSE; **3,536,209,** same, AUTOMATIC MATERIAL-UNIT STORAGE AND METHOD, **filed** Aug. 8, 1976, D.C., N.D. Ill. (Chicago), Doc. 76c2964, *Clark Equipment Co.* v. *Interlake Inc.*

3,508,365, J. G. Ellis, CONCRETE SLAB JOINT CONSTRUCTION, **filed** Aug. 25, 1976, D.C., N.D. Tex. (Dallas), Doc. CA–3–76–1125, *Delta Metalforming Co.* v. *Andy Whiting, doing business as Twin Tool & Die Company.*

3,522,876. (See 3,306,261.)

3,531,724, G. H. Fathauer, SIGNAL-SEEKING RADIO RECEIVER; **3,873,924,** same, **filed** June 23, 1976, D.C., S.D. Ind. (Indianapolis), Doc. IP–76–357–C, *Masco Corporation* v. *Teabury Electronics Corporation and RCA Corp.*

3,536,209. (See 3,503,530.)

3,563,763, Schwall, Rogers and Corbin, SELF-BASTING POULTRY PRODUCTS; **3,853,223,** same, SELF-BASTING POULTRY PRODUCT AND METHOD OF PREPARATION, **filed** June 30, 1976, D.C., N.D. Ill. (Chicago), Doc. 76c2397, *Armour and Company* v. *Land O'Lakes.* **Same, filed** June 30, 1976, D.C., N.D. Ill. (Chicago), Doc. 76c2398, *Armour and Company* v. *Hillman's Inc. et al.*

3,623,447. (See 3,369,518.)

3,625,581, P. Frederick, COMPACT OFFICE FILING CABINET **filed** Nov. 7, 1975, D.C., N.D. Ill. (Chicago), Doc. 75c3812, *Supreme Equipment and Systems Corp.* v. *Interstate Industries Inc.* On stipulation, order cause of action and counterclaim dismissed with prejudice, Sept. 28, 1976.

3,637,138. (See 3,326,468.)

3,658,026. (See 3,369,518.)

3,675,247, J. O. Ferrell, METHOD AND FABRICATING PANTY HOSE, **filed** Apr. 30, 1976, D.C., W.D.N.C. (Statesville), Doc. ST–C–76–13, *Tights Inc.* v. *Aladdin Knit Mills Inc.* Notice of dismissal by plaintiff, it is hereby ordered that this action be dismissed pursuant to Rule 41(a)(1), June 24, 1976. **Same, filed** Apr. 30, 1976, D.C., W.D.N.C. (Statesville), Doc. ST–C–76–15, *Tights Inc.* v. *Slane Hosiery Mills Inc.* Notice of dismissal, it is hereby ordered that this action be dismissed without prejudice, July 7, 1976. **Same, filed** May 28, 1976, D.C., W.D.N.C. (Statesville), Doc. ST–C–76–17, *Tights Inc.* v. *Americal Corporation.* Ordered this complaint dismissed with prejudice, Aug. 4, 1976.

3,675,247. (See 2,826,760.)

3,683,913, Kurtz, Bidwell, Mishkin and Hallstein, UNDERWATER DRAINAGE APPARATUS WITH AIR FLOW METERS, **filed** Aug. 24, 1976, D.C., C.D. Calif. (Los Angeles), Doc. CV–76–2719–WMB, *Deknatel Inc.* v. *Sherwood Medical Industries Inc.*

3,702,749. (See 3,412,427.)

3,724,632. (See 3,338,369.)

3,728,749, Elby and Andersen, TIRE FLOAT AND METHOD FOR FORMING SAME, **filed** Sept. 20, 1976, D.C., W.D. Wash. (Seattle), Doc. C–76–650M, *Topper Floats Inc.* v. *Topper Floats/Northwest Inc.*

3,835,223. (See 3,563,763.)

3,871,585, Crossman, Kenrick and LeMieux, AIR BED; **3,887,187**, same, AIR CUSHION TABLE GAME, **filed** Mar. 18, 1975, D.C., S.D.N.Y., Doc. 75–C–1332, *Ideal Toy Corp.* v. *Brunswick Corp.* Order and judgment dismissed without prejudice, June 22, 1976. **Same, filed** June 3, 1975, D.C., S.D.N.Y., Doc. 75–C–2599, *Ideal Toy Corporation* v. *Brunswick Corporation.* Order and judgment dismissed without prejudice, June 22, 1976.

3,873,024. (See 3,531,724.)

3,887,187. (See 3,871,585.)

Re. 25,360. (See 2,826,760.)

D. 199,591. (See 3,251,514.)

D. 226,036. (See 3,369,519.)

D. 237,758, E. L. Huffman, EYE SHADE WITH REMOVABLE CROWN, **filed** June 28, 1976, D.C., M.D. Fla. (Tampa), Doc. 76–512–C–T–K, *Erline L. Huffman* v. *Bellcair International.* Judgment order of permanent injunction, Sept. 22, 1976.

Plant Patents 1,829, J. Gaujard, ROSE PLANT; **2,078**, H. C. Swim, ROSE PLANT; **2,474**, D. L. Armstrong, ROSE PLANT; **2,488**, Armstrong and Swim, ROSE PLANT; **2,592**, L. Lens, ROSE PLANT; **3,128**, D. L. Armstrong, ROSE PLANT; **3,303**, same; **3,322**, same; **3,348**, same; **3,440**, same; **3,525**, W. E. Lammerts, ROSE PLANT; **3,847**, H. C. Swim and A. W. Ellis, ROSE PLANT, **filed** May 21, 1976, D.C., C.D. Calif. (Los Angeles), Doc. CV–76–1638–HP, *Armstrong Nurseries Inc.* v. *United Rose Growers Inc.*

P.P. 2,078. (See P.P. 1,829.)

P.P. 2,474. (See P.P. 1,829.)

P.P. 2,488. (See P.P. 1,829.)

P.P. 2,592. (See P.P. 1,829.)

P.P. 3,128. (See P.P. 1,829.)

P.P. 3,303. (See P.P. 1,829.)

P.P. 3,322. (See P.P. 1,829.)

P.P. 3,348. (See P.P. 1,829.)

P.P. 3,440. (See P.P. 1,829.)

P.P. 3,525. (See P.P. 1,829.)

PATENT NOTICES

Certificates of Correction for the Week of Jan. 25, 1977

Re. 29,016	3,954,201	3,975,089	3,983,564
D. 240,566	3,954,981	3,975,413	3,983,686
3,582,987	3,955,392	3,975,541	3,983,788
3,615,318	3,957,100	3,975,546	3,983,979
3,631,057	3,957,243	3,975,556	3,983,991
3,661,333	3,957,808	3,975,599	3,984,056
3,712,542	3,958,618	3,975,697	3,984,082
3,781,400	3,960,707	3,975,997	3,984,208
3,841,350	3,960,775	3,976,435	3,984,297
3,852,630	3,961,182	3,977,259	3,984,621
3,859,635	3,961,617	3,977,371	3,985,017
3,871,865	3,962,135	3,977,734	3,985,020
3,874,385	3,962,363	3,977,861	3,985,123
3,876,658	3,965,202	3,978,164	3,985,260
3,888,028	3,965,426	3,979,399	3,985,622
3,893,876	3,965,558	3,979,549	3,985,793
3,894,072	3,966,322	3,979,581	3,985,990
3,903,025	3,968,085	3,979,771	3,986,059
3,903,055	3,969,139	3,979,852	3,986,299
3,923,847	3,970,637	3,980,039	3,986,496
3,938,969	3,971,994	3,980,098	3,987,765
3,943,981	3,972,026	3,980,879	3,987,768
3,946,950	3,972,352	3,981,293	3,987,983
3,948,201	3,972,465	3,981,563	3,988,034
3,951,125	3,972,619	3,981,928	3,989,311
3,952,206	3,974,131	3,982,113	3,991,563
3,952,716	3,974,409	3,982,242	3,991,756
3,953,101	3,974,845	3,982,453	3,991,842
3,953,180	3,974,878	3,982,966	3,992,197
3,953,721	3,974,954	3,983,128	

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF DECEMBER 18, 1976

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	2-2-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	4-22-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	11-11-75
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	2-11-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	1-8-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	8-12-75
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	2-19-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	12-17-75
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	6-21-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	1-22-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	6-10-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	2-26-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	5-5-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	3-1-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	1-12-76
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	5-20-76

Expiration of patents: The patents within the range of numbers indicated below expire during January 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,919,443 to 2,923,007 inclusive
Plant Patents..... Numbers 1,893 to 1,900, inclusive

REISSUES

JANUARY 25, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

NOTE—A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

Re. 29,120

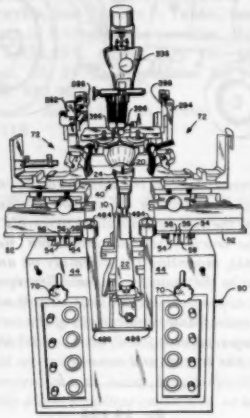
CEMENT LASTING THE SIDE AND HEEL PORTIONS OF A SHOE ASSEMBLY

Walter Vornberger, Tewksbury, Mass., assignor to International Shoe Machine Corporation, Nashua, N.H.

Original No. 3,945,075, dated Mar. 23, 1976, Ser. No. 578,682, May 19, 1975. Division of Ser. No. 467,522, May 6, 1974. Application for reissue May 24, 1976, Ser. No. 689,392

Int. Cl.² A43D *21/00*

U.S. Cl. 12—145 **5 Claims**



3. A method, operable on a shoe assembly formed of a last having an upper mounted thereon and an insole located on its bottom, for applying cement in the corner between a particular portion of the margin of said upper and the periphery of the corresponding portion of the insole and for wiping said margin portion against said insole comprising: providing wiping means mounted for movement, in a prescribed plane substantially parallel to the bottom of the wiping means, in a wiping stroke between a retracted position and an advanced position; providing a bar mounted for heightwise movement in a path that is at right angles to said plane; providing a shoe assembly support that is secured to and extends upwardly of the bar; so supporting the shoe assembly bottom-up on the support that said insole portion substantially lies in a plane parallel to said prescribed plane; initially retaining the wiping means in its retracted position; initially retaining the bar, together with the support, in a lower position; placing a hold-down in a working position in a prescribed location above the support wherein the bottom of the hold-down lies in a wiping plane that is substantially coextensive with the bottom of the wiping means; thereafter [yieldably raising] *applying an upwardly directed yieldable force to the bar to yieldably raise* the bar, together with the support, to cause said insole portion to bear against the hold-down and thus locate said insole portion in said wiping plane; thereafter locking the bar against the heightwise movement; thereafter moving the hold-down away from said working position to a remote position spaced from the shoe assembly whereby said insole portion is retained in said wiping plane by said locking of the bar; thereafter causing a cement applying member to have cement applying movement between a starting position and a final position along said corner past said prescribed location, the movement of the hold-down to said remote position preventing interference between the cement applying member and the hold-down during said cement applying movement; applying cement by the cement applying member into said corner during said cement applying movement; thereafter raising the cement applying member upwardly of the insole; [and] thereafter moving the wiping means through said wiping stroke to wipe said margin portion against the corresponding portion of the insole and bond said margin portion to the corresponding portion of the insole by means of the cement; *and, after the commencement of the wiping stroke, unlocking the bar to thereby enable said yieldable force to press the wiped margin portion against the bottom of the wiping means.*

Re. 29,121

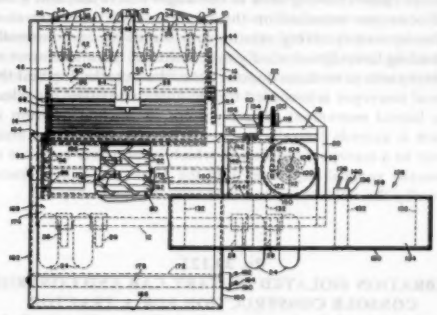
STORAGE TANK AND RECLEANING APPARATUS FOR ROOT CROP HARVESTERS

Richard Wayne Hook, Des Moines, and William Wayne Jackson, Bettendorf, both of Iowa, assignors to Deere & Company, Moline, Ill.

Original No. 3,809,164, dated May 7, 1974, Ser. No. 361,934, May 21, 1973. Application for reissue Oct. 24, 1975, Ser. No. 625,544

Int. Cl.² A01D *17/02*

U.S. Cl. 171—58 **14 Claims**



1. In combination with a root crop harvester having a mobile frame, means carried by the frame for removing roots from the ground and delivering them rearwardly, transverse cleaning conveyor means on the frame for receiving roots from the first-mentioned means and conveying them transversely to one side of the frame while simultaneously removing excess dirt therefrom, a vertically extending conveyor on said one side of the frame for receiving roots from the cleaning conveyor means and conveying the same vertically, and selectively operable means on the upper end of the vertical conveyor for directing roots elevated thereby either outwardly or inwardly relative to the frame, a root storage tank and recleaning apparatus comprising: a walled container mounted on the frame above the cleaning roll conveyor means and inwardly from the vertically extending conveyor, said container having an open top through which roots directed inwardly relative to the frame by the selectively operable means gravitate into the container, and a floor structure for the container having an opening through which roots conveyed thereto gravitate onto the cleaning conveyor, said floor having selectively operable conveyor means associated therewith for conveying roots in the container to said opening.

Re. 29,122

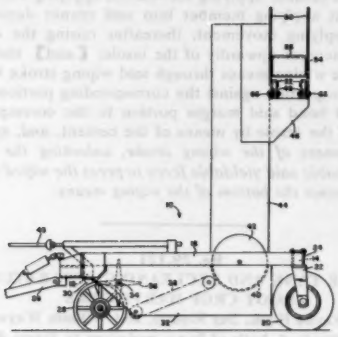
ROOT CROP HARVESTER

Richard Wayne Hook, and Richard David Zaun, both of Des Moines, Iowa, assignors to Deere & Company, Moline, Ill.

Original No. 3,757,867, dated Sept. 11, 1973, Ser. No. 229,669, Feb. 28, 1972. Application for reissue Sept. 5, 1975, Ser. No. 610,870

Int. Cl.² A01D *17/02*

U.S. Cl. 171—58 **17 Claims**



1. A root crop harvesting implement including a main frame, root digging means secured across the forward end of the main frame, a generally upright auger conveyor mounted on the main frame rearwardly of the root digging means, conveyor means supported on the main frame for receiving roots from the root digging means and delivering the same to a lower root-receiving area in the auger conveyor, and a lateral conveyor mounted on the upper end of the auger conveyor in root-receiving relationship therewith and normally extending laterally outwardly to one side of the main frame to deliver roots to an outer deposit area, characterized in that the lateral conveyor is mounted on the auger conveyor for selective lateral movement inwardly from its normal position in which it extends laterally outwardly to one side of the main frame to a transport position in which its opposite ends are in generally vertical alignment with the sides of the main frame whereby the implement can be narrowed for transport.

Re. 29,123

VIBRATION ISOLATED UNITARY CAB AND CONTROL CONSOLE CONSTRUCTION FOR A TRACTOR

Donald Irwin Malm, Davenport; Craig Eugene Christie, Cedar Falls, and Claire Eugene Rojohn, Denver, all of Iowa, assignors to Deere & Company, Moline, Ill.

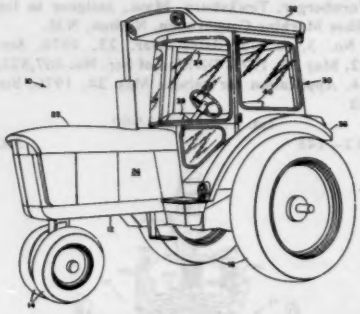
Original No. 3,656,799, dated Apr. 18, 1972, Ser. No. 28,328, Apr. 14, 1970. Application for reissue Sept. 24, 1973, Ser. No. 400,397

Int. Cl.² B62D *27/04*

U.S. Cl. 296—35 R **22 Claims**

1. In a tractor having a rigid main frame including a fore-and-aft extending portion supporting an engine and a hood overlying the engine, and including a pair of rearward transversely extending axle housings projecting outwardly from opposite sides of the main frame, the improvement comprising: a cab disposed generally above a rearward portion of the main frame; a seat mounted within the cab; a generally upright control console disposed forwardly of the seat and rearwardly of the engine and hood and carrying manually actuatable control elements, the cab and control console being connected to form a closed operator's station; a first pair of mounting brackets respectively mounted on opposite sides of the main frame rearwardly of the engine; a first pair of resilient mounting means connecting the control console to the first pair of mounting brackets; a second pair of mounting brackets respectively attached to the opposite axle housing; and a second pair of resilient mounting means connecting the cab to the second pair of mounting brackets, the first and second pairs of mounting means forming a resilient mount for the entire operator's station to isolate the operator' s station from the main frame.

20. In a tractor having a main frame, an operator's cab disposed over a portion of the frame and having a bottom structure, an operator's seat carried in the cab, and a control console disposed over the main frame and at least partially in the cab



ahead of the operator's seat, the improvement comprising: first connection means connecting the console to the bottom structure to combine the two as a unitized assembly during normal operation of the tractor; second connection means, including resilient elements, mounting the assembly on and in vibration-isolated relation to the main frame; said first connection means being separable to separate the cab and console while leaving the console on the main frame; and certain of the second connection means also being separable for at least partial separation of the cab away from the tractor and console.

Re. 29,124

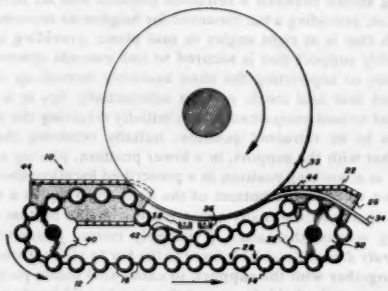
SHEET TRANSPORT SYSTEM

Frederick W. Hudson, West Henrietta, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Original No. 3,826,568, dated July 30, 1974, Ser. No. 391,196, Aug. 24, 1973. Application for reissue July 3, 1975, Ser. No. 592,834

Int. Cl.² G03G *15/00*

U.S. Cl. 355—3 R **7 Claims**



15. [The vacuum belt of claim 1] *An endless vacuum belt system for transporting sheets thereon, particularly suited for transporting copy sheets in electrostatographic systems, comprising:*

a multiplicity of independent elongated tubular vacuum chambers, each with at least one end opening;

flexible interconnecting means flexibly connecting said tubular vacuum chambers in series to form a flexible integral

belt with said tubular vacuum chambers, with said tubular vacuum chambers extending transverse said belt,

said tubular vacuum chambers having sheet-retaining vacuum openings extending therealong;

drive means for moving said belt; and

vacuum means for applying a vacuum inside selected ones of said tubular vacuum chambers from said end openings thereof,

wherein said tubular vacuum chambers are substantially rigid to independently transversely support said belt and any sheets thereon, wherein said tubular vacuum chambers are individually slideably removable from said belt at said flexible interconnecting means to provide an adjustable length belt.

Re. 29,125

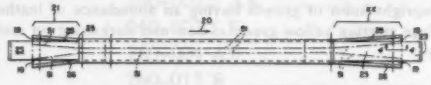
CONTINUOUS MOLDING CONVEYOR WITH SIDE CLAMPING AND RELEASE

Andrew T. Kornylak, and Charles P. Tabler, both of Hamilton, Ohio, assignors to Kornylak Corporation, Hamilton, Ohio

Original No. 3,824,057, dated July 16, 1974, Ser. No. 290,744, Sept. 20, 1972. Application for reissue June 2, 1975, Ser. No. 582,997

Int. Cl.[2] B29D *27/00*

U.S. Cl. 425—115 **31 Claims**



18. Apparatus for the continuous molding of a product, comprising a first endless molding conveyor means, and a second opposed endless molding conveyor means having adjacent runs through a molding zone; said first conveyor means acting as a cover belt to said second conveyor means in said molding zone, said second conveyor means being longitudinally split into at least two generally aligned endless conveyors; at least one of said separate endless conveyors having a side flange within the molding zone closing the corresponding side space between said first and second conveyor means; and means shifting said at least one of said separate endless conveyors and side flange laterally, with respect to the conveying direction in the molding zone, relative to the other of said separate endless conveyors at one of the downstream end and upstream end of the molding zone.

Re. 29,126

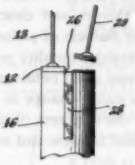
WOUND CAPACITOR

Robert Michael Stockman, Brookfield Center, Conn., assignor to American Radionic Co., Inc., Danbury, Conn.

Original No. 3,792,323, dated Feb. 12, 1974, Ser. No. 360,056, May 14, 1973. Application for reissue Dec. 24, 1975, Ser. No. 644,189

Int. Cl.[2] H01G *1/14*

U.S. Cl. 317—260 **11 Claims**



1. In a wound capacitor of the type having first and second conductive plates separated by a dielectric, the first plate being exposed at one end, and the second plate being exposed at the other end, of the capacitor, the improvement which comprises: at least two leads connected to the plate exposed at each end of said capacitor, said leads being secured to the plate in spaced relationship to each other, the exposed plate at each end defining a slot between said leads.

PLANT PATENTS

GRANTED JANUARY 25, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,011

ROSE PLANT

Dorothy Jean Searles Bailey, Bakersfield, Calif., assignor to San Joaquin Rose Co., McFarland, Calif.

Filed Feb. 25, 1976, Ser. No. 661,276

Int. Cl.[2] A01H *5/00*

U.S. Cl. Plt.—3 **1 Claim**

1. A new and distinct variety of rose plant of the climber class, substantially as shown and described, characterized particularly by recurrent flowers of yellow coloring starting as buds of yellow-yellow orange tonality maturing to flowers of strong yellow coloring and good petalage, borne singly and in small clusters with little color change as the flowers age, on a vigorous plant having dark green, thick, holly-like foliage resistant to blackspot and mildew and very winter-hardy.

4,012

ROSE PLANT

Dorothy Jean Searles Bailey, Bakersfield, Calif., assignor to San Joaquin Rose Co., McFarland, Calif.

Filed Feb. 25, 1976, Ser. No. 661,277

Int. Cl.[2] A01H *5/00*

U.S. Cl. Plt.—11 **1 Claim**

1. A new and distinct variety of rose plant of the hybrid tea class, substantially as shown and described, characterized particularly by flowers of unique bicolor tonality combining red and cerise colors with yellow tone shadings on the obverse of the petals with red streaking and red and yellow coloring on the reverse, high center, spiral petal formation and by a plant of upright habit of growth having an abundance of leathery foliage starting yellow green as new and darkening on maturity.

PATENTS

GRANTED JANUARY 25, 1977

ERRATA

For CLASS	See PATENT NO.
062–018	4,004,430
084–207	4,004,484
235–061.55	4,004,729
429–059	4,004,943
429–215	4,004,944
429–244	4,004,945
429–072	4,004,946
429–017	4,004,947
260–002.58	4,005,033
260–002.5 AJ	4,005,034
260–002.5 AK	4,005,035
260–002.5 F	4,005,036
260–004 AR	4,005,037
260–017 R	4,005,038
260–017.3	4,005,039
260–017.4 SC	4,005,040
260–018 TN	4,005,041
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423–102	4,005,061
536–066	4,005,070
424–245	4,005,083
250–527	4,005,135
426–550	4,005,139
358–195	4,005,256
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358–112	4,005,258
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358–168	4,005,262
358–227	4,005,263
358–145	4,005,265
354–155	4,005,458
354–156	4,005,459
354–202	4,005,460
354–204	4,005,461
354–246	4,005,462
354–307	4,005,463
354–322	4,005,464

PATENTS

GRANTED JANUARY 20, 1977

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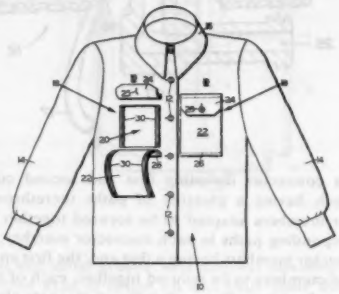
PATENTS

GRANTED JANUARY 25, 1977

NOTE—A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

GENERAL AND MECHANICAL

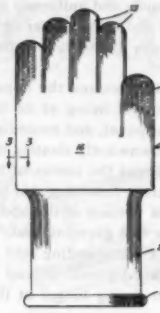
4,004,294
DISGUISED NURSING GARMENT
Louise C. Pinch, Seattle, Wash., assignor to Duane E. Oleson, Lake Oswego, Oreg.
Filed Mar. 4, 1976, Ser. No. 664,007
Int. Cl.[2] A41D *1/20*
U.S. Cl. 2—104 **5 Claims**



1. A disguised nursing outer garment comprising a front portion and a back portion fastened together at the tops and sides thereof to cover a woman's torso, said front portion having a pair of openings formed therein, each said opening having a bottom edge, a top edge and two side edges, respective bottom flaps attached to said front portion along said bottom edge of each said opening and adapted to swing upwardly across said opening overlapping said two side edges thereof, and fastener means on said front portion of said garment and on said bottom flaps respectively for detachably connecting each of said bottom flaps to said front portion of said garment along each side edge of a respective one of said openings, said fastener means comprising mating strips of curly pile loop and hook fastener material attached to said bottom flaps and side edges of said openings respectively so that said mating strips overlap one another continuously along the overlapping portions of said flaps and side edges of said openings when said bottom flaps are in their upward positions.

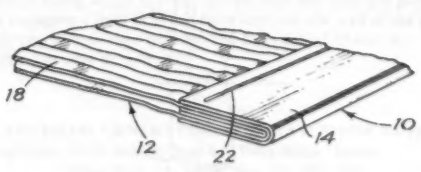
4,004,295
PROTECTIVE GLOVE CONSTRUCTED OF FLEXIBLE STRANDS OF METAL WIRE AND FIBER YARN
Robert M. Byrnes, Sr., 6720 N. 16th St., Omaha, Nebr. 68110
Filed Dec. 30, 1975, Ser. No. 645,477
Int. Cl.[2] A41D *19/00*
U.S. Cl. 2—161 R **2 Claims**

1. A glove for use by persons whose hands are subject to injury such as an operator in a meat processing plant who uses a knife during various meat cutting procedures, said glove being constructed of a flexible woven, non-woven or knitted fabric constructed of flexible aramid fiber yarn strands, such as "Kevlar", and flexible metal wire strands, said strands being associated to form a glove, said glove being substantially



impenetrable by a knife or the like thereby protecting the wearer from accidental injury.

4,004,296
MULTIPLE STRIP GARMENT WITH STITCHED TAPE BORDER AND METHOD OF MANUFACTURING SAME
Walter Kandel, 4834 N. Interstate Ave., Portland, Oreg. 97201
Filed June 23, 1975, Ser. No. 589,042
Int. Cl.[2] A41D *1/14*
U.S. Cl. 2—211 **12 Claims**



1. A garment comprising:
a. at least one elongated, flexible strip reversely folded along its longitudinal axis to form a waist band,
b. a multiplicity of elongated, thin, flexible ribbons disposed side-by-side and reversely folded intermediate their ends, the folded portions of the ribbons being confined between the folded waist band strip and extending outwardly substantially normal thereto to form a fringe skirt having at least a double thickness of ribbons, and
c. securing means interconnecting the ribbons and strips for securing them together.

4,004,297
TROUSER CONSTRUCTION
George Polack, 66 Isabella St., Apt. 1601, Toronto, Ontario, Canada
Filed Jan. 26, 1976, Ser. No. 652,201
Int. Cl.[2] A41D *1/06*; A41B *9/00*
U.S. Cl. 2—227 **9 Claims**

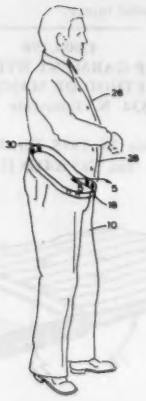
1. Garment construction, for use in the construction of legged garments such as trousers, pyjamas, briefs, and the like said garment construction comprising;
a front panel for covering the body of the wearer from the body crease downward; said body crease being formed by the line of juncture between the legs and abdomen of the wearer when in a sitting position;

a rear panel for covering the hips, seat, and lower back of the wearer, said front and rear panels being joined between the crotch, and along either side to form an integral garment;

said rear panel having an upper edge which is highest at its center point, and slanting continuously and uniformly downwardly towards each side thereof, and said front panel having an upper edge at each side thereof meeting and merging with the upper edge of the rear panel, and slanting continuously and uniformly downwardly towards a lowest point at about the center of the front panel, the front panel thereby being substantially lower than the rear panel,

a waistband extending around the upper edge of said rear and front panels and being at its highest point at the center of the rear panel, and extending in a continuously and uniformly downwardly slanting direction towards its lowest point adjacent the center of the front panel, said waistband essentially following said body crease whereby to leave the front portion of the abdomen of the wearer unconstricted by said garment, and,

suspension means for suspending said garment, and being attachable at spaced points around the waistband, said suspension means being longer at the front than at the back.



9. Undergarment construction, for the construction of a brief or the like for clothing the lower part of the body said undergarment construction comprising;

a front panel portion for covering the body of the wearer from the body crease downward; said body crease being formed by the line of juncture between the legs and abdomen of the wearer when in a sitting position;

a rear panel portion for covering the hips and seat of the wearer, said front and rear panels being joined in the crotch region, and along either side whereby to provide an integral garment;

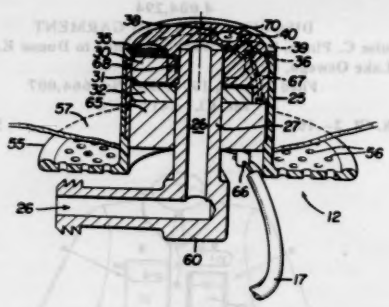
the rear panel having a predetermined height, at about its center, and the upper edge being slanted continuously and uniformly downwardly towards each side, and the front panel having its lowest point at the center, and the upper edge being slanted continuously and uniformly upwardly towards each side, and merging with the upper edge of the rear panel, and there being waistband means extending around said upper edges of said rear and front panels, said waistband means being at its highest point at the center of the rear panel, and slanting continuously and uniformly downwardly and forwardly, being at is lowest point at the center of the front panel.

4,004,298

MAGNETICALLY ALIGNED RELEASABLE CONNECTOR

Paul S. Freed, Oak Park, Mich., assignor to Sinai Hospital of Detroit, Detroit, Mich.

Filed Mar. 31, 1975, Ser. No. 563,360
Int. Cl.² A61F *1/00*
U.S. Cl. 3—1 **7 Claims**



1. In a connector including first and second connector means each having a plurality of paths therethrough, the connector members adapted to be secured together to align the corresponding paths in each connector member, each of said connector members having a first end, the first ends of the connector members to be secured together, each of said connector members including a plurality of magnets electrically insulated from each other, the magnets in said first connector member being positioned to generate magnetic fields of a first spatially oriented pattern; the magnets in said second connector member being positioned to generate magnetic fields of a second spatially oriented pattern; at least one magnet in each connector member also being an electrical path; the improvement comprising:

each connector member including a plate of magnetically conductive material, said plate positioned in said connector member opposed from said first end of said connector member, said plate for reducing the magnetic reluctance in each connector member

at least one fluid path in each connector member, each fluid path having an outlet port at said connector member first end; and

said first and second spatially oriented patterns being complementary so that the forces of magnetic attraction hold the first ends of the connector members together with the fluid path and electrical path of each connector member properly aligned, and the forces of magnetic repulsion precluding misalignment of said paths.

4,004,299

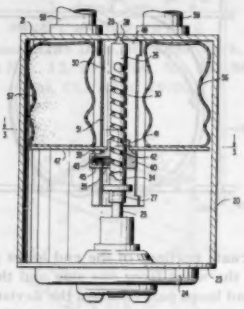
CARDIAC REPLACEMENT AND ASSIST DEVICES

Thomas M. Runge, 2501 Galewood Place, Austin, Tex. 78703

Filed Feb. 12, 1976, Ser. No. 657,703
Int. Cl.² A61F *1/24*; A61M *1/03*
U.S. Cl. 3—1.7 **12 Claims**

1. A cardiac pumping unit comprising a housing, a motor connected with the housing, a rotary shaft coupled with the motor and driven thereby within the housing, said shaft having a spiral groove formed therein lengthwise and being partially roofed for the major portion of the length of the groove, said spiral groove having unroofed entrance and exit portions at its opposite ends and one end portion of the spiral groove diminishing gradually in depth adjacent one unroofed portion, a follower assembly on said rotary shaft including a spring-urged headed rider element for said spiral groove adapted to enter the groove at one unroofed portion and to leave the groove at the other unroofed portion while being cammed outwardly by the gradually diminishing depth of the groove adjacent the last-named unroofed portion, at least one pliable collapsible

blood retaining sac in said housing, a disc element carried by the follower assembly and moving therewith along said rotary shaft in opposite directions to cyclically compress the sac for expelling blood therefrom followed by expansion of the sac to fill the same with blood, said follower assembly being positively driven axially on said shaft in the direction causing compression of the sac by interaction of the headed rider



element and spiral groove, said follower assembly moving in the reverse axial direction on said shaft while the rider element is outside of the groove in response to filling blood pressure and volume in said sac, said partially roofed spiral groove preventing entry of the headed rider element into the groove between said unroofed entrance and exit portions, and a pair of oppositely acting one-way check valves connected with outlet and inlet means of the sac and housing.

4,004,300

FEMORAL PROSTHESIS

Thomas Anthony English, Westwood Close, Beverley, North Humberside, England

Filed Oct. 9, 1975, Ser. No. 621,063

Claims priority, application United Kingdom, Oct. 14, 1974, 44359/74

Int. Cl.² A61F *1/24*

U.S. Cl. 3—1.913 **10 Claims**

1. A femoral prosthesis of the type having a shank, a neck extending from the shank and fixed ball head carried by the neck, which prosthesis comprises, in combination:

a. a split detachable liner for completely enclosing and conforming to the shape of the fixed ball head and a portion of the neck adjacent thereto, which liner includes a first screw thread on a portion of its outer surface; and

b. a detachable ball head having a recess corresponding substantially to the outer configuration of the liner, which recess includes a second screw thread corresponding to the first screw thread such that the liner may be snugly fitted and secured within the recess by engaging the first and second screw threads.

4,004,301

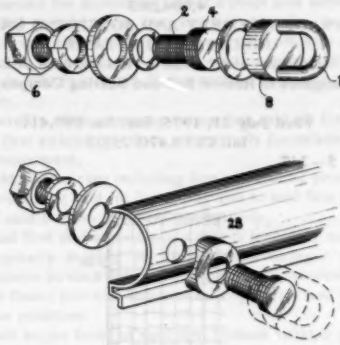
EYELET ARRANGEMENT FOR POOLS

Samuel Kaufman, 860 Pennsylvania Ave., Hagerstown, Md. 21740

Filed Aug. 4, 1975, Ser. No. 601,295

Int. Cl.² E04H *3/16, 3/18;* F16L *22/02*

U.S. Cl. 4—172 **2 Claims**



1. Eyelet arrangement for a swimming pool for holding a rope comprising a stem having an enlarged portion at one end and a smaller portion, the enlarged portion and at least that part of the smaller portion remote from the enlarged portion having threads on the exterior thereof, a nut threadedly engaging such end of the smaller portion, and an eye part comprising an internally threaded socket portion threadedly engaging such enlarged portion and an eye integral with the socket portion, the inwardly directed annular face of the socket portion being larger in cross section than the enlarged portion for engaging a liner between such face and the wall of the pool whereby a liner may be removed by removal of said eye part without access to such nut.

4,004,302

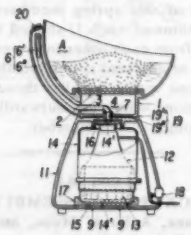
AIR-FOAM GENERATING APPARATUS FOR BATH

Sanji Hori, 9-29 Sako 6-Bancho, Tokushima, Japan

Filed May 23, 1975, Ser. No. 580,288

Int. Cl.² A47K *3/10*

U.S. Cl. 4—178 **2 Claims**



1. In a foam-bathing apparatus, an air-foam generating apparatus for use beneath a body of bathing water comprising a hollow case including a porous foam-generating plate overlying the hollow case, said porous plate including a plurality of meandering passages communicating outer and interior surface of said porous plate with the interior of said case; means for directing pressurized air into said hollow case and out through said porous plate passages for passing through the body of bathing water, said passages having diameters ranging from 0.013 mm to 0.48 mm and producing sonic waves when

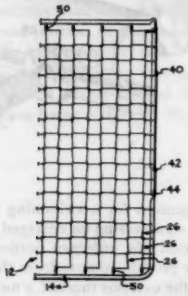
pressurized air is forced through said passages so that a user's skin is subjected to both frictional and vibrational stimuli by air-foams generated beneath the surface of the body of bathing water and engaging a user's skin, said generating plate consisting of a porous porcelain material comprising sintered aluminum oxide grain vitrified (Al_2O_3) produced at a high temperature with the use of an inorganic bonding agents.

4,004,303

SPRING ASSEMBLY AND BOXSPRING UNIT INCORPORATING SAME

Jack C. Mandusky, and Neville L. Riddle, both of Lexington, Ky., assignors to Hoover Ball and Bearing Company, Saline, Mich.

Filed July 21, 1975, Ser. No. 597,411
Int. Cl.² A47C *23/02*
U.S. Cl. 5—247 **2 Claims**



1. For use with a generally rectangular frame, a spring assembly comprising a plurality of individual wire spring members interconnected to form a horizontal yieldable support deck, each spring member having a plurality of side-by-side U-shaped sections, each of said U-shaped sections comprising a base portion and generally parallel leg portions terminating in transversely extending leg extensions, one of said leg extensions being integral with the leg extension of an adjacent U-shaped section on one side thereof and the other of said leg extensions being integral with the adjacent U-shaped section on the other side thereof, said spring members being interconnected so that the junctures of the base portion and the leg portions of each U-shaped section interconnect with an adjacent spring member at the junctures of the leg portions and the leg extensions of the U-shaped section to thereby enable pivotal movement of said spring members relative to each other, the leg portions of each U-shaped section being outwardly bent away from each other intermediate their ends to facilitate assembly of adjacent spring members by moving the base portions on one spring member through the spaces between the leg portions which are outwardly bent away from each other in the other spring member.

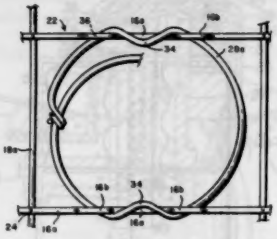
4,004,304

BOX SPRING ASSEMBLY

Walter Harold Kane, Auburn, Mass., assignor to Webster Spring Co. Inc., Oxford, Mass.

Filed Dec. 15, 1975, Ser. No. 640,751
Int. Cl.² A47C *23/02*
U.S. Cl. 5—267 **8 Claims**

1. A spring assembly comprising a border wire to which are attached transversely and longitudinally extending pairs of crossing wires welded at their intersections, said pairs of crossing wires defining seats for attachment thereto of the end loops of coil springs characterized in that at least two opposed wires of the seats contain longitudinally spaced deviations in planes perpendicular to the seats which define in conjunction with the portions of the wire therebetween vertically spaced and longitudinally spaced bearing surfaces and the end loops contain diametrically disposed deviations of such configuration as to require relative deformation of the wires of the seat and the end loops to be interengaged and to become locked by restoration to their undeformed state and wherein the deviations in the end loops lie in the planes of the end loops such that when the end loops are sprung into engagement with the



wires, the arcuate portions of the end loops pass through the deviations in the wires from one side and the deviating portions of the end loops pass between the deviations in the wires from the other side in engagement with the vertically and longitudinally spaced bearing surfaces provided by said deviating and nondeviating portions of the wires so as to prevent relative movement of the end loops perpendicularly and parallel to the plane of the grid.

4,004,305

SLEEPER SOFA AND MATTRESS COMBINATION

Arnold D. Rubin, Highland Park, Ill., assignor to Schnadig Corporation, Chicago, Ill.

Filed Apr. 2, 1976, Ser. No. 673,086
Int. Cl.² A47C *17/14*, *28/08*
U.S. Cl. 5—352 **6 Claims**

1. A sleeper sofa comprising a sofa frame, a folding mattress frame, and a folding spring mattress, the sofa frame having a deck, a pair of arms, and a back, the mattress frame including a head section having a front end and a rear end and a foot section pivotally attached to the rear end of the head section, the head section being pivotally attached to the sofa frame between the arms and being movable between a sleeping position in which the head section extends generally horizontally away from the back of the sofa frame and a sitting position in which the head section is positioned above the deck and between the arms, the foot section being pivotable between a sleeping position in which the foot section extends generally horizontally away from the rear end of the head section and a sitting position in which the foot section overlies a rear portion of the head section, the mattress having a head section which is supported by the head section of the mattress frame and a foot section which is supported by the foot section of the mattress frame and which is hingedly attached to the head section of the mattress, the foot section of the mattress being pivotable with the foot section of the mattress frame between a sleeping position in which the foot section of the mattress is supported by the foot section of the mattress frame and a sitting position in which the foot section of the mattress overlies a rear portion of the head section of the mattress and is supported thereby, the head and foot sections of the mattress being provided with support springs of different com-

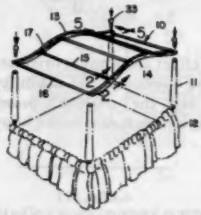
pressibility, the springs of the foot section having greater compressibility than the springs of the head section to provide a relatively soft foot section and a relatively firm head section whereby the body of a person is supported primarily by the relatively firm head section of the mattress when the mattress and mattress frame are in their sleeping positions and a person sits on the relatively soft foot section of the mattress when the mattress and mattress frame are in their sitting positions.

4,004,306

BED CANOPY FRAME

Kenneth H. Gutner, 3285 Dato, Highland Park, Ill. 60035

Filed Nov. 12, 1975, Ser. No. 631,042
Int. Cl.² A47C 29/00
U.S. Cl. 5—362 **5 Claims**



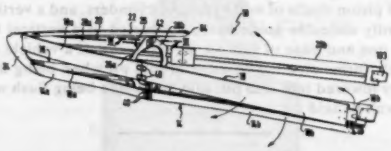
1. A canopy bed frame comprising two arched longitudinal members and a plurality of relatively rigid lateral members adapted to be interconnected adjacent the ends thereof to form a generally ladder-like rectangular frame, said longitudinal members being equipped with receptacles for receiving said lateral members in releasably adjustable fashion, each longitudinal member being constructed of resilient plastic material and having bottom and side walls to provide an open-topped channel shape in cross section, each receptacle being a block integrated with one side wall of an associated longitudinal member and having a bore receiving its associated lateral member, said lateral members having a circular cross section, said bottom wall being equipped with an integral upstanding projection aligned with said bore and slightly overlapping the same whereby said projection flexes to apply an upward bias to a lateral member passing by said projection to stabilize said lateral member in position.

4,004,307

COLLAPSIBLE BOAT FRAME

Franz Hermann, Aisingerwies, Germany, assignor to Klepper-Werke, Rosenheim, Germany

Continuation of Ser. No. 589,666, June 24, 1975, abandoned.
This application Mar. 8, 1976, Ser. No. 664,879
Claims priority, application Germany, July 8, 1974, 2432641
Int. Cl.² B63B 7/04
U.S. Cl. 9—2 C **12 Claims**



1. A collapsible boat frame comprising a fore section and an aft section, each section being elongated and having a longitudinal median plane, each section including:

a. a post located in said plane;

b. two sets of elongated stringers extending away from said post on respective opposite sides of said plane,

1. each stringer of said sets having a first longitudinal portion movably attached to said post and a second portion hingedly attached to said first portion for movement toward and away from a folded position in which said portions are elongated in a common direction and are juxtaposed transversely to said common direction,

2. each set of stringers including a bottom stringer having a major longitudinal face on the first portion thereof;

c. a rib frame including two rib frame portions hingedly connected for movement about a pivot axis substantially parallel to said plane between an operative position in which said rib frame portions extend from said plane in opposite respective directions, and an inoperative position in which said rib frame portions are adjacent said plane;

d. a plurality of pivot means connecting said rib frame with said first stringer portions respectively for relative pivoting movement,

1. said pivot means including first and second pivot means connecting said rib frame portions to said first portions of said bottom stringers respectively,

2. said first and second pivot means including means for angularly moving the first bottom stringer portions relative to each other in response to movement of said rib frame portions between said operative and inoperative positions.

3. said major faces of said first bottom stringer portions converging toward said plane at a predetermined angle in said operative position of the rib frame portions, and at an angle smaller than said predetermined angle in said inoperative position of the rib frame portions; and

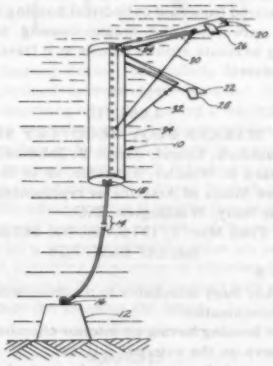
e. coupling means on the second portion of each stringer for releasably coupling said second portion to the second portion of the corresponding stringer in the other section, the median planes of said sections substantially coinciding when the respective stringers thereof are coupled by said coupling means.

4,004,308

HYDRODYNAMIC STABILIZING DEVICE

Calvin A. Gongwer, Glendora, Calif., assignor to The Bendix Corporation, North Hollywood, Calif.

Filed Mar. 11, 1976, Ser. No. 665,994
Int. Cl.² B63B 21/52
U.S. Cl. 9—8 R **6 Claims**



1. A stabilizing structure for an elongated, generally cylindrical housing to be deployed into a body of water having a current, including an anchor and tethering means connecting said housing to said anchor,

a pair of positively buoyant arms hinged to said housing near the top thereof and movable between a first position folded against the side of said housing and a second position extended outwardly from said side, said arms having

an airfoil-like cross-section capable when extended into said current of imparting lift to said arms and to said housing, said arms being extended at an angle between each other with the current direction effectively bisecting said angle,

resilient means also extending outwardly along the under side of said arms, and

cable means extending outwardly from said housing toward said arms and fastened to said resilient means.

4,004,309

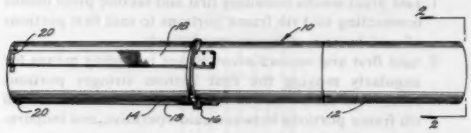
HYDRODYNAMIC STABILIZING DEVICE

Calvin A. Gongwer, Glendora, Calif., assignor to The Bendix Corporation, North Hollywood, Calif.

Filed Apr. 5, 1976, Ser. No. 673,770

Int. Cl.² B63B *21/52*

U.S. Cl. 9—8 R **5 Claims**



1. A structure for deployment into the ocean or similar large body of water comprising

a generally cylindrical housing,

a generally cylindrical removable housing fastened to said first named housing as an extension thereof,

a plurality of brackets attached to said removable housing at the end thereof remote from its attachment to said cylindrical housing,

a releasable ring-shaped clamp securing said removable housing to said cylindrical housing,

and a plurality of fin members each of which is attached at one end to said cylindrical housing at its end nearest said ring-shaped clamp, said fin membrs extending along the length of said removable housing and secured at their opposite ends under said brackets, said fin members being formed of elongated flat strips of metal which are deformed over substantially their entire length to curve outwardly away from said cylindrical housing when not secured under said brackets;

such that when said structure is deployed in the water said clamp is released, permitting said removable housing to be separated from said cylindrical housing and said fins to spring outwardly, and means causing said cylindrical housing to rotate around its axis as it travels downwardly in the water.

4,004,310

MARKER BUOY RECOVERY AID

Albert J. Faulstich, Laurel; James B. Johnson, Silver Spring, and Gerhard B. Winkler, Rockville, all of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 1, 1976, Ser. No. 662,646

Int. Cl.² B63C *7/26*

U.S. Cl. 9—9 **5 Claims**

1. A marker buoy attachable to a submerisible article comprising, in combination:

a buoyant housing having an interior chamber and an annular groove on the external surface;

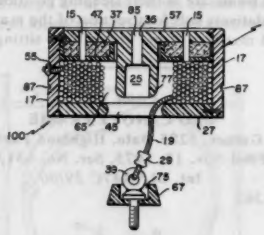
a concentrated, buoyant material attached to the top surface of said chamber to provide initial upright orientation of the upper portion of said housing when afloat;

a length of flexible cord coiled within and extending from said chamber for connecting said housing to a submersible article;

venting means including an opening in each of the upper and lower surfaces of said housing to permit water flow through said interior chamber; and

controllable attachment means for detachably securing said housing to a submersible article,

whereupon release of said housing from the submersible article, said buoyant housing and said concentrated buoyant material effect and upright orientation of said housing and a positive buoyancy, and the difference between the hydrostatic and the chamber pressures vents water through said venting means as the buoy rises to the water surface.



4,004,311

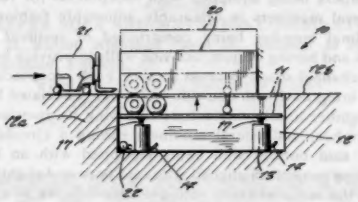
HYDRAULIC LOADING AND UNLOADING DOCK

Sebastian Nola, 311 E. Empire St., San Jose, Calif. 95112

Filed Nov. 12, 1975, Ser. No. 631,060

Int. Cl.² E01D *1/00*

U.S. Cl. 14—71.7 **2 Claims**



1. A hydraulic loading and unloading dock, comprising in combination, an open pit formed within a reinforced concrete, a pair of hydraulic cylinders mounted upon a bottom of said pit, a horizontal platform supported upon said hydraulic cylinders, said platform being vertically movable within said pit and up to an upper edge of said pit; said platform being exchangeable with a second platform, the first said platform being adaptable for truck trailers to ride thereupon, and said second platform being provided with rails for railroad cars to travel thereupon; each said platform having a plurality of transverse panels removable from said platform so as to allow access from above down into said pit therebeneath, mounting housings being fixedly secured to an underside of said platforms, said mounting housings being connected by shafts to the upper end of piston shafts of said hydraulic cylinders; and a vertically upwardly slideable guide being supported in a vertical track along one end edge of said pit for insurance of a vehicle upon said platforms clearing an edge of said pit when being downwardly lowered into said pit; said guide side being flush with a side wall of said pit.

4,004,312

SURFACE WASHING TOOL

Donald Eason, Chicago, Ill., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Apr. 5, 1976, Ser. No. 673,725

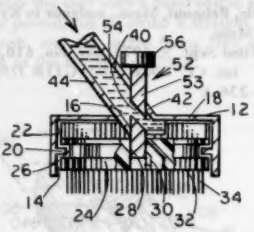
Int. Cl.² A46B *13/06*

U.S. Cl. 15—29 **6 Claims**

1. A surface washing tool comprising:

a. a hollow open ended housing forming a chamber therein, said housing having a hole disposed in the closed end thereof said chamber being provided with a ridge in the walls thereof parallel to said closed side;

b. a round brush member rotatably disposed within said chamber having a central opening therein, a passage from said central opening out through the lower surface thereof, and a groove disposed in the sides of said member, said groove adapted to slideably cooperate with said ridge, said brush member also including a plurality of bristles affixed to the lower surface thereof and a plurality of fin elements affixed to the upper surface of said brush member;



c. a tube element affixed on one end over said hole to said housing, said tubing element having an aperture concentrically aligned with said hole, said tubing element being sealed on the other end and means for affixing a hose to said tubing element for communicating fluids therethrough; and

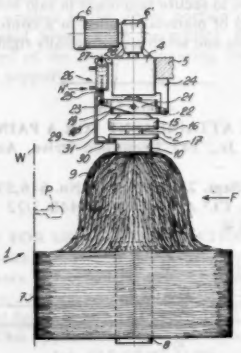
d. a valve means having a tunnel suitable for fluids therethrough adapted to be slideably retained within said hole, said opening, and said aperture, said tunnel adapted to pass fluids from said tubing element with said tunnel in the down position and adapted to spray said fluids from said tubing element against said fin elements of said brush member imparting rotation thereto.

4,004,313

SCRUBBING UNIT FOR VEHICLE-WASHING STATION

Uberto Capra, Alte Ceccato (Venice), Italy, assignor to Ceccato & C. S.p.A., Alte Ceccato (Venice), Italy

Filed Sept. 8, 1975, Ser. No. 611,254
Claims priority, application Italy, Sept. 10, 1974, 27130/74
Int. Cl.² B60S *3/06*
U.S. Cl. 15—53 AB **8 Claims**



1. A vehicle-washing station provided with a support and at least one scrubbing unit engageable with an upright surface of a vehicle moving relatively to said support, said scrubbing unit comprising:

a generally vertical shaft journaled in said support;

drive means for rotating said shaft;

a lower and an upper brush section carried next to each other on said shaft, each of said brush sections having a core provided with a set of flexible bristles forming a substantially cylindrical body during rotation, the bodies of said brush sections being of substantially like diameters, the core of said lower brush section being rigid with said shaft, the core of said upper brush section being freely rotatable on said shaft;

operating means for selectively coupling said upper brush section with said shaft; and

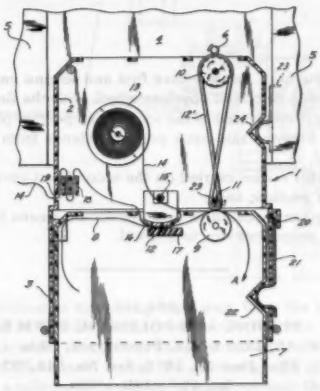
an axially slidable member keyed to said shaft above said upper brush section and displaceable by said operating means between an idling position and a driving position, the core of said upper brush section having a formation engageable by said member in said driving position, said member being provided with an extension terminating in a brake shoe engageable with said formation for arresting said upper brush section in said idling position.

4,004,314

MAGNETIC TAPE CLEANING DEVICE

Herman D. Post, Great Neck, and Seymour Scher, East Meadow, both of N.Y., assignors to Robins Industries Corporation, Commack, N.Y.

Filed Jan. 7, 1976, Ser. No. 646,959
Int. Cl.² G11B *5/00*
U.S. Cl. 15—97 R **13 Claims**



1. A tape cleaning device, particularly for cleaning magnetic tape contained in cartridges, cassettes or analogous receptacles, comprising a housing having a leading end insertable into a tape recording and playing unit having a capstan drive, and a trailing end adapted to receive a receptacle accommodating magnetic tape which is to be cleaned; motion-transmitting means adapted to be driven by said capstan drive and operative for advancing the magnetic tape in said receptacle so as to convey successive portions of the magnetic tape towards and past a predetermined location on said housing; and means for supplying a portion of cleaning tape to said predetermined location for physical contact with said advancing magnetic tape for cleaning the latter.

4,004,315

SUPPORT DEVICE FOR USE WITH A TOWEL OR THE LIKE

Elbert O. Rials, 3603 Oakhurst Drive, Midwest City, Okla. 73110

Filed Jan. 19, 1976, Ser. No. 650,431
Int. Cl.² A47K *10/12*
U.S. Cl. 15—209 R **10 Claims**

1. A support device for accessibly supporting a towel in wearing apparel comprising:

a rigid panel member having a first end portion terminating in a rounded end face and having a second end portion, and having convex arcuate opposite sides and convex arcuate opposite edges extending between the first and second end portions, the opposite sides converging from the first end portion toward the second end portion, and the opposite edges converging from the first end portion toward the second end portion whereby said first end portion is thicker and wider than said second end portion;

a flexible neck portion have first and second end portions, and opposite sides and opposite edges, with the first end portion thereof connected to the second end portion of said panel member whereby said neck portion extends from said panel member;

connector means carried on the second end portion of said neck portion; and

hook means secured to said connector means for hooking said support device to a towel.

4,004,316

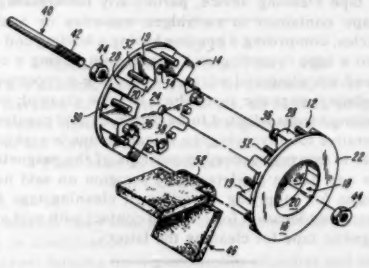
BUFFING AND POLISHING DEVICE

Gregory F. Ali, 2855 Locke, Beavercreek, Ohio

Filed June 13, 1975, Ser. No. 586,797

Int. Cl.² B24D *13/06*

U.S. Cl. 15—230.16 **9 Claims**



1. A buffing, polishing or like device including a hub structure comprised of a pair of substantially identical hub segments each of which includes a cylindrically configured hub portion the outer peripheral surface of which incorporates a series of circumferentially spaced, radially projected, longitudinally extending spokes and a radial flange, a plurality of pin means fixed to said flange to be generally perpendicular thereto and to extend between and in a spaced generally parallel relation to adjacent divergent side surfaces of an adjacent pair of said spokes, said segments including means for a coupling of one thereof to the other to produce said hub structure, said coupling means being arranged and configured to require a rotative movement of one said hub segments relative the other in order to achieve said coupling thereof, in the process of which said spokes, said flanges and the hub portions from which they project define a series of circumferentially spaced pockets which open outwardly from said hub structure and a plurality of strip-like buffing and polishing elements having their intermediate portions looped about the respectively associated pin means and anchored in said pockets and projected outwardly of said hub structure so formed.

4,004,317

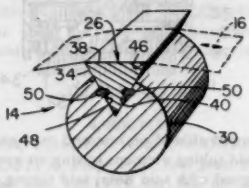
MOUNTING FOR SAPPHIRE BLADED TOOL

John H. Beedle, Belmont, Mass., assignor to Kybe Corporation, Waltham, Mass.

Filed Sept. 5, 1975, Ser. No. 610,626

Int. Cl.³ B08B *1/02*; **G11B** *3/58*

U.S. Cl. 15—236 A **10 Claims**



1. A scraping device for cleaning magnetic tape comprising, in combination,

A. a triangular prism-like sapphire blade elongated between generally triangular end surfaces and having first, second and third faces extending between the end surfaces, and having scraping edges formed at the intersections of said third face with said first face and with said second face, said first and second faces each being recessed with a slot extending longitudinally between said end surfaces with the sides of the slot being spaced from the edges of the blade face,

B. a holder having a generally V-shaped groove and seatingly receiving said blade in said groove with said first and second faces in substantially contiguous abutment with the sides of said groove, each wall of said groove being recessed with a longitudinally extending slot located opposite and in communication with the slot in the contiguous face of said blade, and

C. a key filling each pair of opposed slots in said blade and in said groove to secure said blade in said holder, said key being formed of material applied in a conformable state to fill said slots and set to a substantially rigid shear-resistant state.

4,004,318

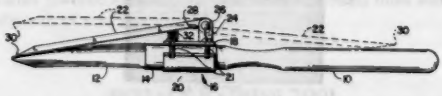
EDGE GUIDE ATTACHMENT FOR A PAINT BRUSH

Carl E. Balkus, Jr., 147 Deepwood Drive, Amston, Conn. 06231

Filed Sept. 25, 1975, Ser. No. 616,579

Int. Cl.² A46B *17/00*; **B44D** *3/22*

U.S. Cl. 15—248 R **6 Claims**



1. An edge guide for a paint brush having a handle, and bristles clamped to the handle by a collar portion, said guide comprising:

a. a clamp assembly adapted for attachment to the collar portion of the paint brush and defining a first part of a hinged joint,

b. a guard defining a second mating part of said hinged joint adjacent one end thereof, said guard having an opposite end with a free edge parallel the hinge line, which hinge line is so located that the guard is movable between an inactive position along side the handle substantially parallel thereto and a ready position along side the bristles,

c. a coil spring having one end acting on said guard in spaced relation to said hinge line and the other end acting on said clamp assembly at least when said guard is in its ready position, said one end of said spring abutting said guard when said guard is in said ready position, said other end of said spring secured to said clamp assembly,

d. said guard being movable against the force of said spring and toward the brush bristles so that said free edge of said guard provides the user with a paint shield at one side of his brush to permit him to strike a straight line of paint with his brush, and the guard being free of the spring when swung to the inactive position.

4,004,319

DRAPERY HOLDER

F. Grant Getchell, 570 Antelope Way, Eugene, Oreg. 97401

Filed July 21, 1975, Ser. No. 597,475

Int. Cl.² A47H *15/00*

U.S. Cl. 16—93 D **1 Claim**

1. A drapery holder for temporary supporting engagement with the folds of a drapery, said holder comprising in combination,

an elongate support having upper and lower surface areas,

a series of drapery engaging members in slideable engagement with said support, each of said members having an elongate upper portion and an enlarged bottom portion with upright drapery engaging surfaces on said bottom portion cooperating with like surfaces on adjacent like members to clamp drapery folds therebetween, each of said upper positions of said drapery engaging members further having an opening defined by diagonally offset upper and lower edges for contact with the upper and lower surfaces of said elongate support, said opening also defined by a downwardly inclined surface area contiguous with said lower edge, reaction forces exerted in one direction by a clamped drapery fold on the lower portion of a member causing said lower edge of same to rotate about said upper edge into locked engagement with the lower surface of said support while conversely finger-tip pressure applied to the upper portion of the holder will release said lower edge permitting drapery releasing movement of the drapery engaging member along the elongate support.

4,004,320

APPARATUS FOR USE IN EVISCERATION OF POULTRY

Donald J. Scheier, and Homer A. Haynes, both of Kansas City, Mo., assignors to Gordon Johnson Company, Kansas City, Mo.

Division of Ser. No. 242,722, April 10, 1972, Pat. No. 3,802,028. This application Oct. 3, 1973, Ser. No. 403,119

Int. Cl.² A22C *21/06*

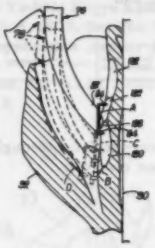
U.S. Cl. 17—11 **25 Claims**

1. In an eviscerating machine:

a support for a carcass having an access opening to the body cavity thereof;

a scrubbing tool movable into and out of said cavity through said opening; and

mechanism for reciprocating the tool through a number of scrubbing strokes after it is moved into said cavity for



detaching at least certain viscera from the carcass prior to moving the tool out of the cavity.

4,004,321

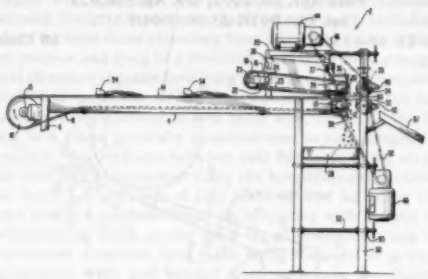
CRAB MEAT EXPRESSING MACHINE AND METHOD

George H. Harrison, 817 Jefferson Ave., Newport News, Va. 23607

Filed Mar. 28, 1975, Ser. No. 563,218

Int. Cl.² A22C *29/00*

U.S. Cl. 17—48 **18 Claims**



1. The method of expressing crab meat from the shell of a half body of an at least partly-cooked crab, wherein the crab has been cleaned, de-clawed, and severed in half along its fore-and-aft mid-line to expose the central cavity of the half body along a substantially vertical section opposite the fin side of the body which comprises;

moving the half body along a path with the exposed section facing contra to the direction of travel and the fin side of the body facing forwardly in the direction of travel,

and applying squeezing forces to the body by pressing the same between two opposed surfaces which converge towards one another along substantially straight lines, which forces increase gradually from the fin side towards the exposed section of the body until meat is expressed from the body through the exposed section thereof.

4,004,322

ASEPTIC SERUM COLLECTION METHOD

Rex S. Spendlove, Logan, Utah, assignor to Spendlove Laboratories, Logan, Utah

Filed Dec. 17, 1975, Ser. No. 641,391

Int. Cl.² A22C *21/04*

U.S. Cl. 17—51 **7 Claims**

1. A method for aseptically collecting blood from an animal fetus comprising the steps:

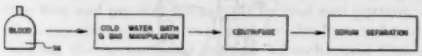
obtaining an animal fetus;

exposing the heart of the fetus;

suspending the animal fetus so that the heart is lower than a substantial portion of the fetus;

treating a portion of the heart surface to kill contaminating microorganisms;

cannulating the heart through the treated portion with an aseptic cannula; and



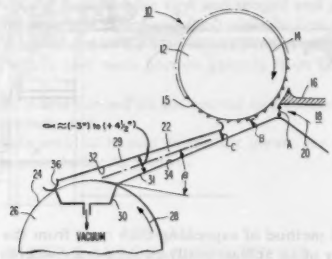
draining blood from the fetus through the cannula into an aseptic collection reservoir.

4,004,323

METHOD OF FORMING A NONWOVEN FIBROUS WEB

Joel Peter Gotchel, Philadelphia, Pa.; Henry James Norton, Wilmington, Del.; Aris Constantine Spengos, Wallingford, and Lawrence Vaalburg, Brookhaven, both of Pa., assignors to Scott Paper Company, Philadelphia, Pa.

Filed Apr. 10, 1975, Ser. No. 566,923
Int. Cl.² D01G *25/00*; D04H *1/72*
U.S. Cl. 19—156.3 10 Claims



1. A method for forming a nonwoven fibrous web at a speed in excess of 200 ft./minute and in a basis weight range of from about 1 oz./yd.² to about 6 oz./yd.², said web including at least a preponderance by weight of short cellulosic fibers of a papermaking length less than ¼ inch, said method comprising the steps of:

A. separating fibers from a feed mat which includes at least a preponderance by weight of short cellulosic fibers of a papermaking length less than ¼ inch and entraining said fibers in a gaseous medium to form a gaseous suspension of fibers;

B. conveying the gaseous suspension of fibers in a stream to a convex forming surface while confining said stream by substantially flat front, back and side inner surfaces of a duct that is disposed at an incidence angle to said forming surface in the range of from about 10° to about 30°, and in which the front and back inner surfaces, in a direction toward the foraminous forming surface, provide an included angle in the range of less than about 3° convergence up to about 4½° divergence;

C. moving the convex forming surface at a speed in excess of 200 ft./minute; and

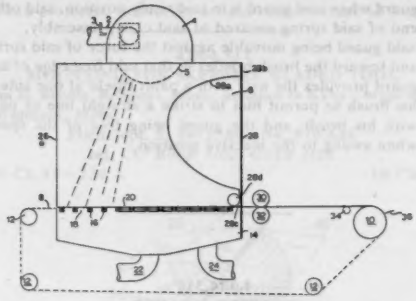
D. continuing to confine said stream by inner surfaces of the duct while depositing the fibers from the suspension onto the moving forming surface in the form of a nonwoven fibrous web having a basis weight in the range of from about 1 oz./yd.² to about 6 oz./yd.².

4,004,324

APPARATUS FOR PRODUCING FIBROUS WEBS

Frank Bridge, Bolton, and Tej Kuldip Singh, Baildon, both of England, assignors to The Associated Paper Mills Limited, London, England

Continuation-in-part of Ser. No. 842,889, July 18, 1969, abandoned. This application Mar. 13, 1972, Ser. No. 234,098
Int. Cl.² D01G *25/00*
U.S. Cl. 19—156.3 1 Claim



1. An apparatus for forming a fibrous web comprising a longitudinally extending foraminous fibre-receiving member, means for moving said member in said longitudinal direction, means defining an expansion chamber disposed above said fibre-receiving member; supply means for supplying a stream of fibres to said expansion chamber, said supply means being of fixed dimensions in both the longitudinal and transverse directions, said supply means being disposed in fixed geometrical relationship with said expansion chamber and initiating the passage of said fibres downwardly through said expansion chamber in downwardly progressing zones of progressively decreasing fibre density; both said expansion chamber and said fibre-receiving member being larger than said supply means in said transverse direction so that the profile of said stream of fibres progressively becomes wider in both said longitudinal and transverse directions as the fibres move downwardly; a curved baffle being disposed in said expansion chamber and projecting a convex surface inwardly and in a direction opposite to the direction of travel of said fibre-receiving member, said baffle being disposed transverse of said direction of travel, means defining a suction chamber disposed beneath said foraminous fibre-receiving member which suction chamber is larger than said supply means in both said longitudinal and transverse directions, and means for reducing the pressure in said suction chamber below that in said expansion chamber for holding the formed web on said fibre-receiving member while permitting expansion of the fibres during their downward passage through said expansion chamber.

4,004,325

KEY RING AND/OR CHAIN HOLDER

Louis H. Hubachek, 870 S. Gramercy Place, Los Angeles, Calif. 90005

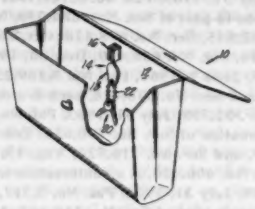
Filed Aug. 6, 1975, Ser. No. 602,199
Int. Cl.² A45C *11/32*
U.S. Cl. 24—3 K 5 Claims

1. A key holder, comprising:

a. an elongated bracket of block-like configuration arranged for surface attachment in an upright position to a support, said bracket having a key-slot extending between its ends, the key-slot including a straight slot portion opening into one face of said bracket and extending the full length thereof, and an enlarged inner slot portion communicating with the straight slot portion and having its ends terminating respectively at opposite ends of said

bracket, and with one of the end openings being restricted; and

b. a key attaching member which includes a body having a shoulder for preventing passage of the body through the key-slot, an elongate neck portion extending from said shoulder and terminating in a head portion, said head and



neck portions being of a size to permit movement thereof along the key-slot with the head portion in the enlarged inner slot portion and the neck portion in the straight slot portion, and being removable from the key-slot in a direction from the restricted said one end opening to the other end opening only when the shoulder is positioned for movement in a path outwardly of said face of the bracket.

4,004,326

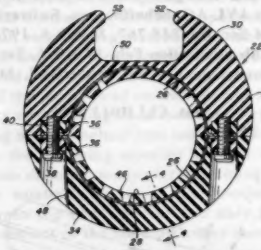
CABLE PROTECTOR

John Andrew Beavers, Tulsa, Okla., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Dec. 22, 1975, Ser. No. 643,733

Int. Cl.² F16C *1/26;* **A44B** *21/00;* **E21B** *17/10*

U.S. Cl. 24—81 CC **4 Claims**



1. Apparatus for protecting cable connected to a tubing string comprising:

a generally cylindrical elastomeric material member having

a cylindrical bore adapted to encompass and be secured to a portion of the length of the tubing of the string;

said bore being eccentric with respect to the periphery of said cylindrical member and providing thickest and thinest sections;

said cylindrical member being axially split into two portions for installation on the tubing string;

means for securing the two portions together; and

means defining a longitudinal slot in the thickest section of said member for receiving cable which slot is dimensioned so that the cable is positioned entirely therewithin.

4,004,327

SLIDE FASTENER

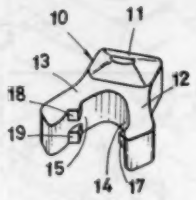
Takeo Fukuroi, Uozu, and Moriyoshi Hayashi, Kurobe, both of Japan, assignors to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed July 8, 1975, Ser. No. 594,053

Claims priority, application Japan, July 16, 1974, 49-84261[U]

Int. Cl.² A44B *19/06*

U.S. Cl. 24—205.13 R **1 Claim**



1. A slide fastener including a pair of oppositely disposed carrier tapes each carrying on and along one longitudinal beaded edge a series of discrete fastener elements, said fastener elements each comprising a coupling head, a pair of legs extending from the coupling head and having oppositely disposed inner wall portions, and a plurality of teeth formed integral with said legs and projecting from said oppositely disposed inner wall portions, each of said teeth including a pair of inclined faces extending from an outer edge to an inner wall portion and lying in a direction transverse to said longitudinal direction thereby forming a tooth generally triangular in shape, said tooth also having two opposite generally flat faces generally perpendicular to said inner wall, each said flat face lying in a plane generally perpendicular to said longitudinal direction, the thickness between said flat faces being smaller than said legs as measured along the longitudinal direction of said beaded edge, each of said teeth on one leg being staggered and at a predetermined pitch spacing with respect to a corresponding tooth on the other leg as measured along said longitudinal direction, said teeth being disposed in gripping engagement with said beaded edge to secure the fastener elements thereto.

4,004,328

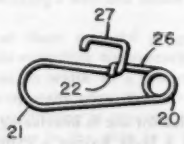
SNAP HOOK FOR FISHING TACKLE

August C. Bohn, 1423 Walnut SE., Grand Rapids, Mich. 49508, and Glenn B. Morse, 321 Fountain NE., Grand Rapids, Mich. 49503

Continuation of Ser. No. 554,478, March 3, 1975, abandoned. This application Apr. 9, 1976, Ser. No. 675,584

Int. Cl.² A44B *13/02*

U.S. Cl. 24—237 **3 Claims**



1. A snap hook formed of a single length of spring wire and comprising:

a coil;

a first extension projecting tangentially from said coil and terminating in a hook configuration;

a second extension projecting tangentially from said coil, said second extension being formed into a bight and having a hook configuration complementary to that of said first extension; and

an actuating extension at the free end of said second extension, said actuating extension a portion offset from and in the same plane as said second extension, the arrangement being such that depression of said offset portion moves the hook configuration of said second extension into a disengaging position relative to said hook configuration of said first extension.

4,004,329

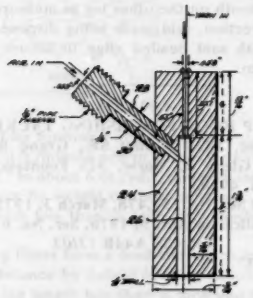
YARN INTERLACING AIR JET

Joe F. London, Jr., Greensboro, N.C., and Jean-Louis Lauber, Munchenstein, Switzerland, assignors to Burlington Industries, Inc., Greensboro, N.C.

Continuation of Ser. No. 421,850, Dec. 5, 1973, Pat. No. 3,911,655, which is a continuation of Ser. No. 217,059, Jan. 11, 1972, abandoned. This application Sept. 18, 1975, Ser. No. 614,660

Int. Cl.² D02G 1/16

U.S. Cl. 28—1.4 **3 Claims**



1. An air jet device for use in interlacing textured yarn, said device comprising a body having a cylindrical chamber of about one-eighth inch diameter formed within said body for movement of yarn therethrough, a coaxial yarn feed passage of a diameter smaller than said chamber leading into said chamber, an air inlet of a cross-section smaller than that of said chamber and having an axis which converges with respect to the axis of the chamber in the direction of yarn movement through said chamber and intersecting therewith at an angle of between 45° and 75° measured between said inlet and said passage, means for supplying air under pressure to said inlet and means for supplying yarn to said coaxial yarn feed passage.

4,004,330

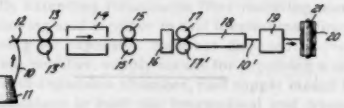
TEXTILE TREATMENT APPARATUS

Robert K. Stanley, Media, Pa., assignor to Techniservice Division Textured Yarn Co., Inc., Kennett Square, Pa.

Continuation-in-part of Ser. No. 214,893, Jan. 3, 1972, Pat. No. 3,808,654, which is a continuation of Ser. No. 846,457, July 31, 1969, Pat. No. 3,781,952, which is a continuation-in-part of Ser. Nos. 684,230, Nov. 20, 1967, Pat. No. 3,462,815, Ser. No. 678,428, Oct. 26, 1967, Pat. No. 3,462,814, Ser. No. 606,420, Dec. 30, 1966, and Ser. No. 835,883, June 9, 1969, Pat. No. 3,559,254, said Ser. No. 684,230, and Ser. No. 678,428, each is a continuation-in-part of Ser. No. 302,758, July 31, 1963, Pat. No. 3,376,622, which is a continuation of Ser. No. 790,658, Feb. 2, 1967, Pat. No. 3,111,740, and Ser. No. 216,524, Aug. 13, 1962, abandoned, said Ser. No. 606,420, is a continuation-in-part of Ser. No. 386,489, July 31, 1964, Pat. No. 3,317,977, which is a continuation-in-part of Ser. No. 216,447, Aug. 13, 1962, Pat. No. 3,145,947, said Ser. No. 835,883, is a continuation-in-part of Ser. No. 650,762, July 3, 1967, abandoned, which is a continuation of Ser. No. 349,338, March 4, 1964, Pat. No. 3,348,283. This application July 16, 1973, Ser. No. 379,318 The portion of the term of this patent subsequent to Jan. 1, 1991, has been disclaimed.

Int. Cl.² D02G 1/12

U.S. Cl. 28—1.6 **19 Claims**



1. In apparatus for treating thermoplastic textile strands, the improvement including strand-drawing means and including also strand-crimping means immediately downstream therefrom, with strand-preheating means comprising a strand-supporting roll and roll-heating means therewithin located in advance of at least the strand-crimping means.

4,004,331

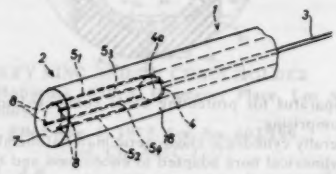
METHOD OF MANUFACTURING MULTI-WIRE OXYGEN ELECTRODE

Helmut List, and George Fredericks, both of Graz, Austria, assignors to AVL AG, Schaffhausen, Switzerland

Division of Ser. No. 555,767, March 6, 1975, Pat. No. 3,965,383. This application Feb. 19, 1976, Ser. No. 659,435 Claims priority, application Switzerland, Mar. 15, 1974, 3642/74

Int. Cl.² H01J 9/36

U.S. Cl. 29—25.15 **8 Claims**



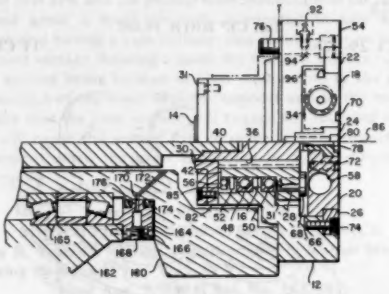
1. A method of manufacturing a multi-wire oxygen electrode comprising the steps of: providing a cathode wire and a round glass rod, fixedly connecting with one another the cathode wire and the round glass rod at one end while forming a substantially semi-spherical shaped transition of thinner cathode wire to thicker glass rod, providing electrode wires spanned at the transition which forms a support surface, electrically conductively connecting the electrode wires at the

cathode wire, bending the electrode wires over the semi-spherical shaped transition-support surface, extending the bent electrode wires along the glass rod and bonding the electrode wire ends at the glass rod by means of an adhesive mass, inserting the cathode wire with the glass rod and the electrode wires into a glass sleeve, said glass sleeve possessing a substantially tubular-shaped tip dimensioned to receive the glass rod with the electrode wires, positioning the glass sleeve to be substantially vertical and with the tip downwardly directed, fusing together the thus positioned glass sleeve with the glass rod, and wherein the length of the glass rod and the wall thickness of the sleeve tip are selected such that during fusing the weight of the melt just compensates the surface tension forces causing a contraction of the melt and the electrode wires in the glass are neither elongated nor curved, and then cutting-off an end piece of the tip fused with the glass rod in order to obtain an electrode tip having an electrode end surface with the cross-sectional surfaces of the electrode wires located therein freely exposed.

4,004,332
FACING HEAD

Walter W. Wawrzyniak, 39230 Gary, Mt. Clemens, Mich. 48043

Filed Dec. 18, 1975, Ser. No. 641,937
Int. Cl.² B23B *7/00, 3/26*
U.S. Cl. 29—27 C **10 Claims**



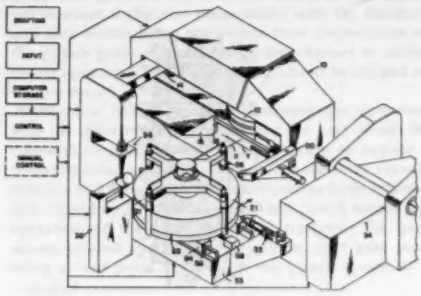
1. A facing head adapted to be secured directly to a spindle for rotation therewith, comprising a housing, means for securing the housing directly to the spindle from the front thereof, at least one slide transversely slidably supported on one end of the facing head, an actuating member positioned centrally of the facing head and cam means operable between the actuating member and slide for producing movement of the slide transversely of the facing head on movement of the actuating member axially of the facing head including a cylindrical cam member having internal helical cam teeth and external helical cam teeth on the actuating member meshed with the cam teeth on the cam member, means for restraining the actuating member from rotating relative to the housing and means operable between the cam member and slide for producing transverse movement of the slide on rotary movement of the cam member.

4,004,333
PUNCHING, CONTOURING, HANDLING APPARATUSES AND METHOD

Dennis Daniels, Bellevue, Wash., assignor to U.S. Amada, Ltd., City of Industry, Calif.

Division of Ser. No. 386,064, Aug. 6, 1973, Pat. No. 3,949,635, which is a continuation-in-part of Ser. No. 359,983, May 14, 1973, abandoned. This application Feb. 18, 1975, Ser. No. 550,439
Int. Cl.² B23Q *1/16;* **B23D** *33/02*
U.S. Cl. 29—38 C **14 Claims**

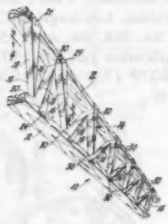
1. Apparatus for cutting and deburring irregular peripheral shapes on self form-sustaining sheet material parts comprising powered chuck means for clamping and rotating each part, means for positioning the chuck means sequentially at loading, cutting, deburring and discharging stations, said chuck positioning means including powered means linearly translating the chuck means during simultaneous rotation of the parts identically at said cutting and deburring stations, means positioning tools at said cutting and deburring stations for engaging two parts simultaneously in a common direction relative to the chuck means for cutting and deburring the same irregular peripheral shapes on each, and control means for actuating said chuck rotating means and said linear translating means to rotate and translate the parts while in engagement with said tools at said cutting and deburring stations for cutting and deburring the same peripheral contour on the parts.



4,004,334
METHOD OF MAKING A STRUCTURAL MEMBER

Henry R. Greenley, 1435 SE. 15th St., Apt. 104, Fort Lauderdale, Fla. 33316

Division of Ser. No. 520,987, Nov. 5, 1974, abandoned. This application Mar. 10, 1976, Ser. No. 665,791
Int. Cl.² B23P *17/00*
U.S. Cl. 29—155 R **3 Claims**



1. A method of making a web and chord structural member comprising:

slitting a strip of sheet material progressively along its length, each slit extending transversely from one edge of the strip across its width to a predetermined terminus point near the opposite edge, the slits being parallel and alternate slits originating at opposite sides of the strip,

forming slot sections in the strip in a pattern alternating from side to side along the edges of the strip adjacent said terminus points,

twice folding the portion of the strip between each pair of said slits to form strut members,

stretching the slitted strip to form a web of struts interconnected in head-to-tail zig-zag arrangement with the slot sections at the edges of the web aligned to accommodate a chord member,

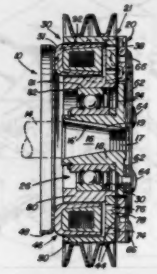
and placing a chord member in said slot sections at each edge of the web and attaching the chord members to the web.

4,004,335

METHOD OF MAKING CLUTCH PULLEY

William C. Pierce; Samuel M. Berry, both of Dallas, and Arthur D. Johnson, Carrollton, all of Tex., assignors to Pitts Industries, Inc. (Entire), Dallas, Tex.

Filed Nov. 11, 1975, Ser. No. 630,886
Int. Cl.² B21K *1/42*
U.S. Cl. 29—159 R 12 Claims



1. A method of making a clutch pulley assembly for an electromagnetic clutch comprising the following steps;

a. cutting a short section of tubing from a long piece of tubing to form the hub portion of said assembly,

b. machining one end of said short section of tubing to have an undercut outer edge,

c. press forming an annular disc of metal with a central aperture therein to have an outer flange extending substantially perpendicular from the outer edge of said disc

d. mounting the aperture of said disc on the undercut edge of said tubing section, and

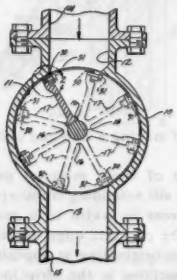
e. die swaging the end of said tubing section so that the hub section and disc become integral and make a good strong and magnetically efficient joint.

4,004,336

INTERCOMPARTMENT SEAL FOR ROTARY FEEDER

Forrest E. Logan, Claremont, Calif., assignor to Occidental Petroleum Corporation, Los Angeles, Calif.

Division of Ser. No. 388,388, Aug. 15, 1973, Pat. No. 3,913,800. This application July 28, 1975, Ser. No. 599,675
Int. Cl.² B23P *15/00, 7/00;* G01F *11/20*
U.S. Cl. 29—156.4 R 2 Claims



1. In a rotary feeder having a housing that defines a cylindrical cavity with a curved peripheral surface of radius, R, a rotor mounted to rotate within the cavity, at least from compartment defining radial walls on the rotor, and a radially adjustable sealing surface mounted at the end of each radial wall, the method of establishing an intercompartment seal between the end of each radial wall and the peripheral surface of the cavity, the method comprising the following steps in the order recited:

removing the rotor from the housing cavity;

rotating the rotor while removed from the housing;

cutting a sealing surface at the end of each blade to the radius, R, while rotating the rotor to form on the end of each blade a curved sealing surface with a radius of curvature that matches the curvature of the peripheral surface;

adjusting each blade radially inward;

returning the rotor in the housing cavity; and

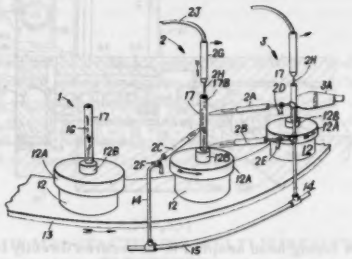
adjusting each blade radially outward so each blade is uniformly and closely spaced from the peripheral surface of the housing cavity by a distance which establishes controlled fluid leakage between the compartments defined by the radial walls and blades.

4,004,337

APPARATUS FOR REED SWITCH MANUFACTURE

John Hill, Bickley, and Henry Turczanki, Beckenham, both of England, assignors to Comtelco (U.K.) Limited, Tonbridge, England

Division of Ser. No. 443,203, Feb. 19, 1974, Pat. No. 3,908,266. This application Apr. 29, 1975, Ser. No. 572,910
Claims priority, application United Kingdom, Feb. 20, 1973, 8276/73
Int. Cl.² H01H *11/00*
U.S. Cl. 29—756 11 Claims



1. Electrical sub-assembly encapsulating apparatus comprising:

at least one workhead for supporting said sub-assembly at only one end thereof in vertical co-axial alignment with a length of glass tubing, the sub-assembly being composed of at least two conductive elements rigidly but temporarily joined in a desired spatial relationship by at least one fusible and electrically conductive bridging piece, said glass tubing being of a length greater than the desired length of the capsule being formed, said glass tubing and sub-assembly having an unsupported end;

means for moving said workhead through a series of fixed work stations, pausing at each while a manufacturing operation is performed on the supported sub-assembly and glass tubing;

one or more stations having one or more burners, the flames from which are adjusted and directed toward the position said sub-assembly and tubing will occupy when pausing at that station to provide sealing of said sub-assembly and said tubing to thereby encapsulate said conductive elements within said tubing; and

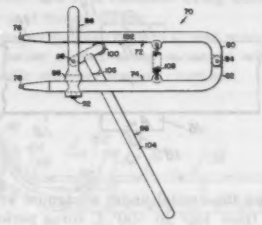
means at one or more of said work stations for injecting purge gas into said tubing and including a hypodermic needle connected to a supply of pressurized purge gas and having an open end adapted to be moved into the unsupported open end of said tubing for introducing a flow of purge gas to the interior of said tubing during the sealing thereof.

4,004,338

SNAP RING TOOL

Francis John Breitbach, Dubuque, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Nov. 4, 1975, Ser. No. 628,795
Int. Cl.² B23P 19/04
U.S. Cl. 29—229 4 Claims



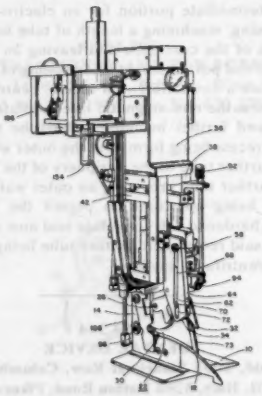
1. In a snap ring tool of a type including first and second elongate arms pivotally interconnected to each other and having respective free ends configured for engaging opposite ends of a snap ring for deflecting the latter upon pivotal movement of the arms; the improvement comprising: lever support means fixed to the first arm at a location between the free end of the first arm and the pivotal interconnection of the first and second arms; a lever pivotally connected to said support means and having a cam surface; said second arm including a recessed surface defining a guide for the cam surface; and the cam surface being located in such relationship to the pivotal connection of the lever with the support and to the recessed surface that the cam surface will engage the recessed surface and will cause the second arm to pivot in a first direction of movement when the lever is pivoted in a first direction of movement.

4,004,339

SINGLE PISTON OPERATED CLIP DEVICE

Clyde R. Velarde, Raleigh, N.C., assignor to Rheem Manufacturing Company, New York, N.Y.

Filed Apr. 7, 1975, Ser. No. 565,581
Int. Cl.² B23P 11/00
U.S. Cl. 29—243.56 21 Claims



1. An improved clipper mechanism comprising, in combination:

a. a bracket assembly including fixed punch guide means defining a portion of a punch and clip guide channel, clip feed means for feeding a clip into the channel, and die means at one end of said channel for forming a clip cooperatively with punch means;

b. reciprocal punch means mounted in the fixed punch guide means for travel in the channel between a retracted position and an extended, clip attachment position;

c. drive means for driving said punch means reciprocally between the retracted and extended positions, said drive means mounted on the bracket assembly;

d. gate means attached to the assembly for cooperation with the punch guide means to form a complete closed channel to guide a clip into cooperation with the die means, and gate means being removable from cooperation with the punch guide means forming the channel to define a throat opening for positioning material to be clipped over the die means; and

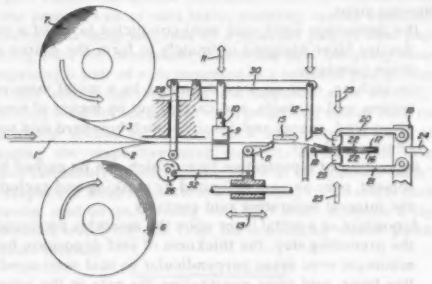
e. mechanical linkage means connecting the gate means with the drive means for retracting the gate means from cooperation with the punch guide means to expose the throat opening when the punch means are in the retracted position and for closing the gate means to form a continuous, closed channel for said clip and punch means upon operation of the drive means to transport the punch means toward the extended position, said gate means being closed prior to travel of the punch means to the extended position.

4,004,340

PROCESS OF CUTTING DEVELOPED FILM STRIPS INTO FILM SECTIONS AND OF IMMEDIATELY SUBSEQUENTLY INTRODUCING SAID FILM SECTIONS INTO SLIDE FRAMES

Otfried Urban, Garmisch-Partenkirchen, Germany, assignor to Geimuplast Peter Mundt KG, Garmisch, Germany

Continuation-in-part of Ser. No. 263,202, June 15, 1972, abandoned. This application Dec. 18, 1974, Ser. No. 534,132
Claims priority, application Germany, June 25, 1971, 2131611; Oct. 28, 1971, 2153874
Int. Cl.² B23P 17/04
U.S. Cl. 29—417 11 Claims



1. A process of cutting developed film strips into film sections and of immediately subsequently introducing said sections into slide frames made of plastic material supplied ready for use, comprising feeding two protective strips of transparent material on respective sides of a film strip in a series of intermittent feeding steps, said protective strips having for each feeding step at least one perforation hole which is aligned with a perforation hole of the film strip, the two protective strips sandwiching the film strip to form a sandwiched film strip, advancing said film strip in said feeding steps to a cutting device; severing the leading film section with said cutting device, gripping the film section severed by the cutting device with a plierlike gripping device and in this position, without being pivotally moved through 180°, inserting the severed section as far as to the position for projection into the internal space of an expanded frame, and releasing the expanded frame to return to its original shape to hold the film section in position for projection.

4,004,341

METHOD OF MANUFACTURING FIELD-EFFECT TRANSISTORS DESIGNED FOR OPERATION AT VERY HIGH FREQUENCIES, USING INTEGRATED TECHNIQUES

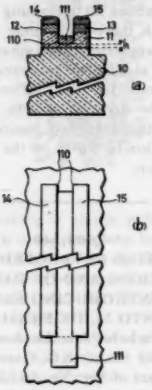
Pham Ngu Tung, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Dec. 5, 1975, Ser. No. 638,037

Claims priority, application France, Dec. 13, 1974, 74.41129

Int. Cl.² B01J *17/00*

U.S. Cl. 29—571 **10 Claims**



1. A method of manufacturing field-effect transistors designed to operate at very high frequencies, using integrated circuit techniques, said method commencing from a substrate of semi-insulating material covered by a semi-conductor layer having a given conductivity type, said method comprising the following steps:

- the deposition upon said semi-conductor layer of a conductive layer designed ultimately to form the source and drain contacts;
- ion etching, over an area delimited by a metal mass protecting said contacts, and carried out by means of ions of given kind, energy and density, which bombard said semi-conductor layer;
- deposition of a protective layer which can be etched by a solvent, over an area delimited by masking and excluding the interval separating said contacts
- deposition of a metal layer upon the assembly produced in the preceding step, the thickness of said deposition being minimum over areas perpendicular to said semi-conductive layer, said layer constituting the gate in the interval separating said contacts;

electrolytic etching of said metal layer, except in the interval separating said contacts;

- elimination of said protective layer using a solvent;
- ion etching eliminating said semi-conductor layer at the locations where it is exposed.

4,004,342

FABRICATION OF ION IMPLANTED P-N JUNCTION DEVICES

Yoon Soo Park, Kettering, and Phil Won Yu, Dayton, both of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

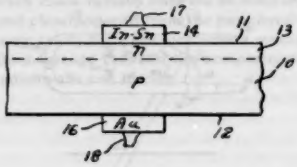
Filed Feb. 23, 1976, Ser. No. 660,521

Int. Cl.² B01J *17/00*

U.S. Cl. 29—590 **5 Claims**

1. A method of fabricating a p-n or p-i-n junction device in a p-type $CuInSe_2$ single crystal having a first (112) plane surface and a second (112) plane surface which comprises the steps of:

a. bombarding the first plane surface with cadmium, zinc, bromine or chlorine ions at an energy of 135 keV to a dose level ranging from about 10^{14} to 10^{16} per square centimeter, thereby forming an n-type layer in the crystal adjacent the first plane surface;



b. annealing the crystal under a vacuum at a temperature ranging from 300° to 500° C for a period of 10 to 30 minutes;

c. depositing an indium-tin alloy electrical contact on the first surface; and

d. depositing a gold electrical contact on the second surface.

4,004,343

METHOD OF MAKING CORE TUBES FOR SOLENOIDS

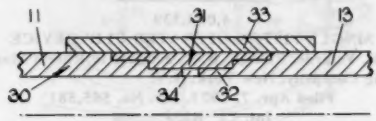
John Thomas Marsden, Lower Tean, England, assignor to Expert Industrial Controls Limited, Lount, England

Filed Apr. 15, 1975, Ser. No. 568,263

Claims priority, application United Kingdom, Apr. 18, 1974, 16898/74

Int. Cl.² H02K *15/02*; **H01F** *41/02*

U.S. Cl. 29—596 **2 Claims**



1. A method of manufacturing a core tube having a non-magnetic intermediate portion for an electro-magnetic solenoid comprising; machining a length of tube so as to form the end portions of the core tube and leaving an integral bridge between said end portions, said bridge being of thinner section so as to define a circumferential recess, centrifugally casting into said recess the non-magnetic intermediate portion of the core tube, and further machining the tube to remove said bridge, said recess being formed in the outer wall of said tube, securing a further tube to the periphery of the first mentioned tube, said further tube providing an outer wall to said recess, said bridge being apertured to permit the liquid material which when hardened will constitute said non-magnetic insert, to flow into said recess, said further tube being removed after the step of centrifugal casting.

4,004,344

DENTAL DEVICE

Gary K. Gold, 5065 Stoneboat Row, Columbia, Md. 21044, and Alan H. Hart, 3204 Hatton Road, Pikesville, Md. 21208

Continuation of Ser. No. 503,678, Sept. 6, 1974, abandoned. This application Sept. 4, 1975, Ser. No. 610,290

Int. Cl.² A61C *1/10*

U.S. Cl. 32—27 **8 Claims**

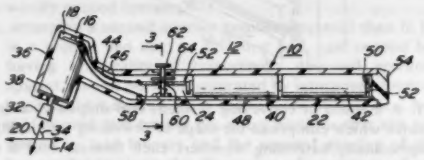
1. A dental device for removing stains from teeth comprising:

a. a housing having a head member extending in a predetermined direction forming a first chamber and a longitudi-

nally and linearly extended handle member forming a second chamber, said extended handle member adapted to be gripped between an operator's thumb, index and fore fingers said handle member and said head member being formed in one piece construction, said extended directions of said head and handle member forming an angle approximating 50° therebetween;

b. motor means mounted within said first chamber of said head member said first chamber being contoured to receive only said motor means;

c. electrical power means coupled to said motor means said electrical power means being mounted within said extended handle member second chamber;



d. stain removal means rotatively coupled directly to said motor means in linear alignment through rotative securement to a rigid shaft member passing through said head member of said housing, said shaft member being opposingly mounted only to said stain removal means and said motor means, said shaft member having an extended length substantially less than said head member whereby said stain removal means may be easily manipulated at varying angles when contacting said teeth; and

e. means for actuating said stain removal means in rotative displacement, said actuation means being mounted in said longitudinally extended handle member of said housing adjacent said head member in positional placement for actuation by one finger of said operator while said handle member is being gripped.

4,004,345

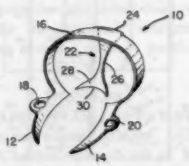
DISTAL RETRACTION CLAMP FOR RUBBER DAM

Sherman S. Ely, 11005 NE. 9th, Bellevue, Wash. 98004

Filed Nov. 17, 1975, Ser. No. 632,279

Int. Cl.² A61C 5/12

U.S. Cl. 32—36 **15 Claims**



1. In a rubber dam retaining clamp of the type including a spring arch connecting a pair of opposed jaws for gripping respective inner and outer sides of a tooth in a dental arch adjacent the gum line, the improvement comprising arm means connected to said clamp and adapted to contact the distal area of the rearmost tooth in the arch adjacent the gum line for retracting the distal gingival tissue and overlying portion of a rubber dam through which the tooth projects.

4,004,346

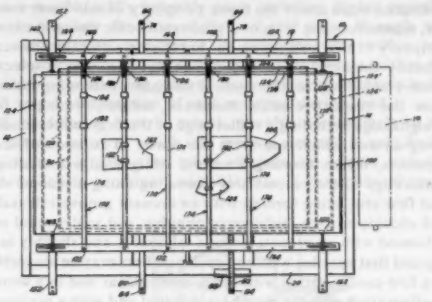
MACHINE FOR THE MULTIPLE GRADING OF PATTERNS FROM A MASTER PATTERN

William Kaufman, 4 Stonehurst Court, Pomona, N.Y. 10970

Filed July 28, 1975, Ser. No. 599,832

Int. Cl.² A41H 3/00

U.S. Cl. 33—17 A **9 Claims**



1. A pattern grading machine comprising a support frame, a horizontally disposed table, slide means movably mounting said table on said support frame, a plurality of parallelogram linkages, a plurality of paper holding bars mounted on said parallelogram linkages for movement with said linkages relative to said support frame in varying increments of distance when table is moved, each of said paper holding bars comprising a channel bar having an open upper end, means for mounting a plurality of pattern reproducing sheets in selected corresponding pairs of said paper holding bars, with said sheets stacked in superimposed relationship over the surface of said table, and mounting means for supporting at least one master pattern section above the uppermost pattern reproducing sheet, said master pattern mounting means comprising a pair of elongated strap supports extending longitudinally of said support frame and spaced from each other on opposite sides of the central axis of said table, coupling means removably securing said strap supports to a selected pair of said paper holding bars for movement therewith, said coupling means comprising a pair of rods mounted in a selected pair of channel bars and projecting from the opposite ends thereof, a mounting member secured to each projecting end of each rod, and clamp means secured to each mounting member and engaging the respective strap support, at least one strap, means releasably mounting said strap at its opposite ends to the respective strap supports and extending transversely therebetween, said straps forming with said strap supports a rigid framework overlying said table for supporting master pattern sections thereon.

4,004,347

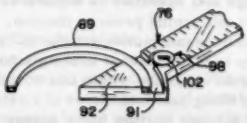
GRAPHICS INSTRUMENT

Sarah Hesse, 929 Oxford St., Berkeley, Calif. 94707, and Justin J. Shapiro, 39 Domingo Ave., Berkeley, Calif. 94705

Division of Ser. No. 452,635, March 19, 1974, Pat. No. 3,925,899. This application July 24, 1975, Ser. No. 598,781

Int. Cl.² B43L 7/06

U.S. Cl. 33—120 **2 Claims**



1. A graphics instrument comprising an inner scale member which includes a first annulus having a circular outer periph-

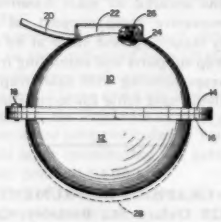
ery, an outer scale member which includes a second annulus having a circular inner periphery mounted for rotation with respect to said first annulus about a common axis, first and second arms mounted on respective inner and outer scale members, said inner and outer members being formed with coplanar surfaces adapted to move over a graphics surface, said arms each having surfaces which are coplanar with said coplanar surfaces of the scale members, means forming a first graduated scale about the outer periphery of said inner member, means forming a second graduated scale about the inner periphery of said outer member in register with said first scale whereby the scale members can be positioned in a selected relative angular position, each of said arms extending radially from the respective scale members, means forming a first straight edge including a radial edge of the first arm extending along an axis which intersects the center of rotation of scale members, means forming a second straight edge including a radial edge of the second arm extending along a second axis, said first arm being formed with an arcuate groove releasably and slidably seating said second annulus, and said second arm is formed with an arcuate groove releasably and slidably seating said first annulus whereby said members may be assembled in a first configuration with the arms coplanar and in a second configuration with the members inverted and with a portion of one arm lying in a plane spaced from the other arm for alignment against a reference surface for utilizing the instrument in the manner of a T-square.

4,004,348

HIGH PRESSURE COMPASS HOUSING

John T. Fowler, and William H. Key, both of Winthrop, Mass., assignors to The Laitram Corporation, New Orleans, La.

Filed Jan. 16, 1975, Ser. No. 541,655
Int. Cl.² G01C *17/06*
U.S. Cl. 33—364 **3 Claims**



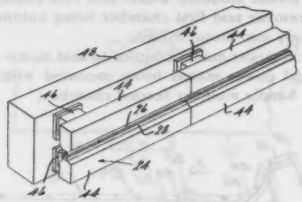
1. A magnetic compass housing comprising:
first and second housing portions each having a mating peripheral flange adapted to be secured to the other;
at least one of said housing portions being formed of a resilient material being impervious to the flow of fluid therethrough and operative to expand and compress in response to differential pressure thereon;
means for attaching said mating peripheral flanges in sealing relationship to form a sealed housing interior;
a damping liquid contained within said housing interior and completely filling said interior;
said resilient housing portion being operative in the presence of a high external pressure to compress and cause the pressure of said damping liquid to increase to approximately the external pressure.

4,004,349

METHOD FOR FLUID CONVEYANCE OF ARTICLES

John W. Neumann, Birmingham, Mich., assignor to Oxy Metal Industries Corporation, Warren, Mich.

Filed Oct. 21, 1975, Ser. No. 624,547
Int. Cl.² B65G *51/10*; F26B *3/10*
U.S. Cl. 34—10 **12 Claims**



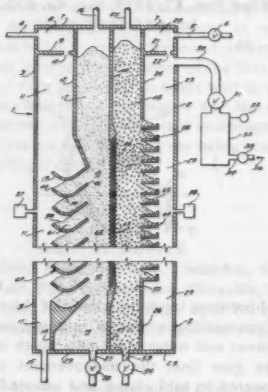
1. A method of conveying resilient cup-shaped cylindrical articles which comprises the steps of providing a plurality of longitudinally extending members each formed with a supporting surface having a partial circular conforming transverse configuration and formed with a plurality of ports therein, orienting said members to position said supporting surfaces in opposed longitudinally extending alignment at a distance to provide clearance between the walls of an article disposed therebetween, positioning an article with its closed end disposed in the intended direction of travel between the plurality of opposed supporting surfaces, discharging a pressurized fluid from said ports in impinging relationship against the longitudinally extending exterior wall surface of the article in a manner to support the article on a cushion of fluid in spaced relationship relative to said supporting surfaces and to effect an inward deflection of the rearward portion of the article in response to the fluid pressure applied against the wall thereof imparting a converging taper on moving from the leading closed end to the trailing open end of the article and thereby imposing a force vector on the article in the direction of intended travel for propelling the article along said members.

4,004,350

TREATING GAS AND FINE GRANULAR MATERIAL IN PANEL BED

Arthur M. Squires, 245 W. 104 St., New York, N.Y. 10025

Filed Aug. 28, 1974, Ser. No. 501,275
Int. Cl.² F26B *3/00*
U.S. Cl. 34—33 **9 Claims**



1. A method of contacting gas and granular material with

each other in a panel bed having loose gas-entry granular material faces supported by support members and fitted for cleaning and renewal of the faces by puffback to effect physical or chemical treatment of at least one of gas and granular material comprising:

a. arranging a first, fine granular material in a first bed having a plurality of transversely disposed upwardly spaced gas entry portions separated by interposed supporting members, said members having outer and inner edges with respect to the bed whereby said gas entry portions have gas entry faces substantially contiguous with said outer edges, and said first bed having gas exit portions spaced from said inner edges and said gas exit portions being supported by transversely disposed upwardly spaced louvers;

b. arranging a second coarser granular material than in (a) in a second bed next to said first bed, said second bed having a plurality of transversely disposed upwardly spaced gas exit portions separated by interposed supporting members spaced from the louvers of said first bed, said second bed having gas entry portions that are supported by said louvers and the upward spacing of said louvers being about the dimension of a particle of said coarser granular material so that said second material does not participate in the body movement of the fine granular material in the first bed that accompanies the action of puffback;

c. forwardly flowing gas in a substantially continuing flow during said treatment through the gas entry portions of said first granular material bed and outwardly from the gas exit portions of this bed and through the gas entry portions of said second granular material bed and outwardly from the gas exit portions of this second bed to effect said treatment of one of said gas and said first granular material;

d. thereafter causing a transient flow of gas to move in the direction in reverse to the flow of said gas in (c); and

e. causing said transient reverse flow to produce first a rise at a given rate of rise and subsequently a fall in the pressure difference between said gas exit portions of said second bed and said gas entry portions of said first bed, said difference produced by said transient reverse flow remaining greater than a first critical minimum difference for a time of less than about 150 milliseconds, said first critical difference being that difference at which a steady flow of gas in said reverse direction just produces a localized spill of said first granular material from said gas entry faces of said first bed, and said difference produced by said transient reverse flow peaking to a top value beyond a second critical minimum difference, which is the pressure difference at which a transient flow of gas in said reverse direction producing said pressure difference at said rate of rise just initiates a body movement of said first granular material supported by said interposed members toward said gas entry faces of said first bed to spill a portion of said first granular material from the bed while said second granular material does not participate on account of the dimensional relationship between the upward spacing and the coarser particle.

4,004,351

GRAIN DRYING APPARATUS

Douglas D. Sanneman; Ernest Stalder, both of Clay Center, and Robert C. Chaffee, Green, all of Kans., assignors to Gilmore-Tatge Manufacturing Co., Inc., San Francisco, Calif.

Filed July 28, 1975, Ser. No. 599,892
Int. Cl.² F26B *17/00*
U.S. Cl. 34—52 **4 Claims**

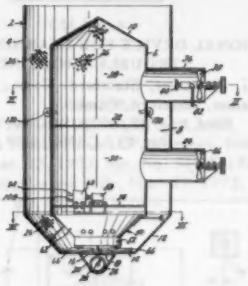
1. A grain drying apparatus comprising:

a. a body assembly through which grain to be dried passes in a continuous flow pattern, said assembly including a drying zone through which said grain passes one time only,

b. means operable to pass a permeating flow of heated air through said grain within said drying zone, whereby moisture is removed from said grain, said heated air being supplied at a generally uniform rate and temperature, whereby the moisture content to which said grain is reduced within said drying zone is rendered generally inversely proportional to the temperature to which said grain is elevated within said drying zone,

c. a mechanically operable grain metering device operable to regulate the rate of flow of said grain through said drying zone, and hence its retention time within said drying zone, the retention time of the grain within the drying zone being generally inversely proportionate to the speed of operation of said metering device, and

d. modulating control means operable responsively to the temperature to which said grain is elevated in said drying zone to regulate the speed of operation of said metering device to produce a variable rate of grain flow through



said drying zone such that grain is elevated to a generally uniform temperature within said drying zone despite variations in the moisture content of grain entering said drying zone, said control means comprising a hydraulic motor operable to drive said metering device and having an essentially closed operating hydraulic circuit, the operating speed of said motor being generally proportionate to the rate at which hydraulic fluid is supplied thereto, a variable delivery hydraulic pump in said circuit and operable to deliver fluid to said motor, a control valve disposed in said circuit downstream from said motor, thermostatic means responsive to the temperature attained by the grain within the drying zone to permit fluid flow through said valve generally directly proportionate to said temperature, and means operable to vary the delivery rate of said pump continuously, and being responsive to fluid pressure in said hydraulic circuit between said motor and control valve to vary the delivery rate of said pump in generally inverse ratio to said pressure.

4,004,352

GRAIN DRYING APPARATUS

Vincent B. Steffen, 321 E. Hamilton, New Hampton, Iowa 50659

Filed Jan. 16, 1975, Ser. No. 541,384
Int. Cl.² F26B *19/00*
U.S. Cl. 34—233 **5 Claims**

1. Grain bin apparatus comprising:

a bin;

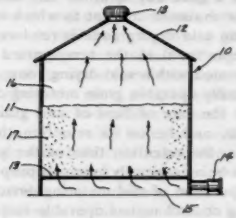
a perforated floor in said bin;

a chamber on each side of said floor;

air circulating means connected to said bin for forcing air under pressure to enter one of said chambers and exhaust from an opening in the other of said chambers; and

means rotatably attached to said bin and encompassing said opening for modulating the flow of air exhausting out of said other chamber, said modulating means having a

substantially horizontally disposed fluid impervious central plate member for substantially preventing precipitation from entering the bin and a plurality of spaced turbine-shaped blades connected to said central portion and extending downwardly therefrom.



4,004,353

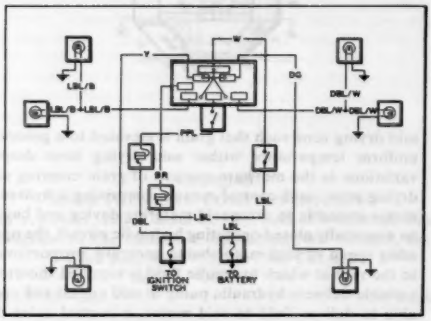
EDUCATIONAL DEVICE FOR LEARNING AUTOMOTIVE TROUBLE-SHOOTING

Charles G. Valentine, Stamford, Conn., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 27, 1973, Ser. No. 355,134

Int. Cl.² G09B 25/02

U.S. Cl. 35--13 **5 Claims**



1. An educational kit for teaching automotive electrical wiring and automotive electrical trouble-shooting procedures comprising as integrated component parts thereof:

a. a simulator board having a surface of magnetically attractive material and including graphic indicia on the surface thereof defining a schematic diagram of an automobile electrical system,

said diagrams further including designated locations for positioning manipulative pieces bearing indicia representing electrical symbols, the indicia on said simulator board being as shown by the non-numerical indicia of FIG. 1;

b. a plurality of magnetically attractive manipulative pieces individually bearing graphic indicia on their surfaces comprising symbols representing parts of an auotmobile electrical system or symbols representing electrical connections, the indicia on said manipulative pieces being as shown by the non-numerical indicia of FIG. 3;

c. audiovisual instructional means including synchronized recordings and visual slides or filmstrips presenting information relevant to the automotive systems including information defining the relationship between the indicia on said pieces and the indicia on said simulator board;

said audiovisual instructional means further characterized in that it is periodically stopable to permit the user to perform a manipulative activity requested by the instructional means using said simulator board and said manipulative pieces, and being restartable again by the user upon completion of the activity;

d. a display board for said manipulative pieces including a sheet of magnetically attractive material. said display board having graphic indicia on a surface thereof in spaced relationship, said graphic indicia corresponding to the indicia present on each of said manipulative pieces, said manipulative pieces adapted for storage on and removal from said display board;

said manipulative pieces adapted for manipulation on the simulator board and in conjunction with the simulator board indicia by the user in response to said instructional means such that the automobile electrical system and component parts and circuitry thereof can be constructed and graphically depicted, said magnetically attractive board or alternatively each of said magnetically attractive pieces being magnetic to provide a mutual attraction between said pieces and said board.

4,004,354

GROUP RESPONSE ANALYZING SYSTEM

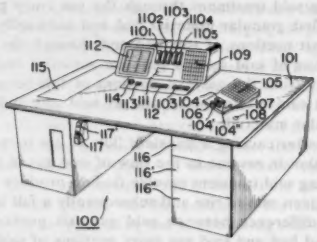
Satoshi Yamauchi, Tokyo, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan

Filed Sept. 25, 1972, Ser. No. 291,620

Claims priority, application Japan, Sept. 30, 1971, 46-76737

Int. Cl.² G09B 5/14

U.S. Cl. 35—48 R **4 Claims**



1. A group response analyzing system comprising: a central console for a questioner, a plurality of terminal response consoles for questionees, an intercommunication channel selectively connecting said central console and terminal response consoles to transmit information therebetween, said channel including an answer line for transmitting, from the terminal response consoles to the central console, responses by the questionees to each of a succession of questions posed by the questioner and a call line for transmitting, from the central console to the terminal response consoles, calls or instructions from the questioner to the questionees, scanning means for successively selecting individual terminal response consoles to cause each selected terminal response console to supply to the central console a response to a question via said answer line of the intercommunication channel and to subsequently cause each selected terminal response console to receive from the central console calls or instructions from the central console via said call line of the interconnection channel, and means for processing the responses supplied to the central console, wherein the improvement comprises;

memory means for storing indications of the responses from the terminal response consoles to a question from the central console, said responses being supplied to the central console by the terminal response consoles via the answer line of the intercommunication channel, said memory means comprising a plurality of stages, each stage associated with an individual terminal response console and storing the response supplied therefrom to the central console via said answer line of the intercommunication channel; and

control means connected to said scanning means and to said memory means for selectively preventing or permitting the selection of each terminal response console for connection to the central console via said call line of the

intercommunication channel depending on the response from said terminal response console to a previous question, which response is stored in the associated stage of the memory means;

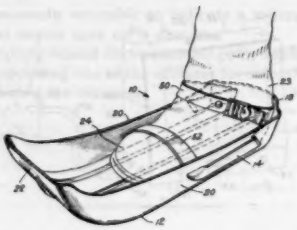
whereby the response which a terminal response console gives to a question determines whether this terminal response console will be selected or not by the scanning means for connection to the central console via said call line.

4,004,355

SHOE DEVICE AND METHOD OF ATTACHING A STRAP TO A SHOE MEMBER

Jeffrey M. Koblick, Hopkins, Minn., assignor to K-tel International, Inc., Minnetonka, Minn.

Filed May 20, 1976, Ser. No. 688,416
Int. Cl.² A43B *5/04*
U.S. Cl. 36—122 **7 Claims**



1. A shoe device comprising, in combination:

a shoe member having a first and second heel slot, at least a first and second toe slot, and a first and second intermediate slot;

a single continuous retaining strap passing outwardly through said first heel slot, inwardly through said second heel slot, outwardly through said first intermediate slot, inwardly through said first toe slot, outwardly through said second toe slot, inwardly through said second intermediate slot, outwardly through said first heel slot and inwardly through said second heel slot to define a first and second end portion and a toe-retaining loop; and

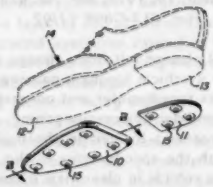
means for securing said first and second end portions of said single continuous retaining strap to define an ankle-retaining loop.

4,004,356

STUDDED SOLE AND HEEL PLATES FOR SHOES

William J. Green, Salt Lake City, Utah, assignor to James P. Watters, Bountiful, Utah

Filed Nov. 17, 1975, Ser. No. 632,221
Int. Cl.² A43B *5/00*
U.S. Cl. 36—134 **2 Claims**



1. A plate for securing to the ground engaging surface of a sole or heel of a shoe comprising:

a thin flexible plastic molded plate having a shape similar to only the ground engaging portion of the sole or heel of a shoe,

a plurality of metallic stud means molded into said plate at spaced positions on its ground engaging surface thereof,

each of said stud means comprising a dome shaped member protruding from the ground engaging surface of said plate a given distance and each having a like plane extending laterally of the longitudinal axis of the dome flush with the ground engaging surface of the plate, and

a plurality of studs one extending out of each of the dome shaped members along their longitudinal axis in a common direction for engaging the ground on which the shoe is used,

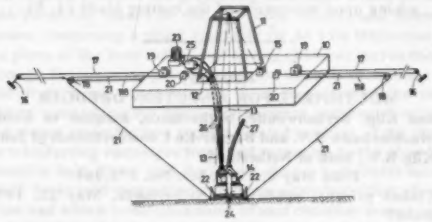
said stud means being formed integral with said dome shaped member and said plate.

4,004,357

TWO STROKE DREDGING PLANT

Giovanni Faldi, Via Forese Donati 27, Florence, Italy

Filed Mar. 13, 1973, Ser. No. 340,811
Claims priority, application Italy, Mar. 17, 1972, 22024/72
Int. Cl.² E02F *3/88*
U.S. Cl. 37—58 **3 Claims**



2. A dredging plant comprising in combination disintegrating and conveying shovel means and a submerged pumping unit, said pumping unit having at least two pumping chambers, distributor means connected to said pumping chambers and thereby connecting said disintegrating and conveying shovel means to a source of compressed air via alternate ones of said pumping chambers, said pumping unit and disintegrating shovel means in assembly being adjustably suspended with respect to height from a watercraft which in operation is anchored to only two fixed points between which working strokes are carried out, the said disintegrating and conveying shovel means further comprising two shovels each of which has a working edge facing in a direction opposite from that of the other, said disintegrating and conveying shovel means further having valve means which may be stably changed over to one of two positions whereby one or the other said two shovels is connected to said pumping unit, and cables connected to each of said two shovels, each of said cables having an axis, starting from its connection with said shovels which intersects the center line of said watercraft at a point external to the watercraft itself and in operation controls the inclination of each of said shovels with respect to the vertical, with each of said cables for adjusting the inclination of the shovels being fixed at their free end to a winch for adjusting the inclination mounted on the watercraft and, for the first section starting from the watercraft towards their respective shovel, being taut both at the bow and stern of the watercraft, with vertical rod or bar means immersed in the water to a variable depth.

4,004,358

METHOD AND APPARATUS FOR DREDGING OF GROUND, PARTICULARLY SAND

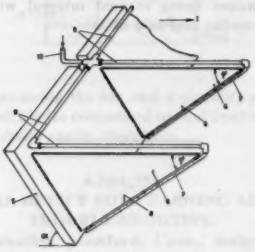
Adriaan Gabriél van Os, Voorschoten, Netherlands, assignor to Stichting Speurwerk Baggertechniek, Delft, Netherlands

Filed Dec. 18, 1974, Ser. No. 533,953

Claims priority, application Netherlands, June 4, 1973, 7307773

Int. Cl.² E02F 3/92

U.S. Cl. 37—63 7 Claims



1. A method of underwater dredging in which soil or sand is loosened comprising

moving at least one cutting blade (1, 5) through the soil;

providing means at the failure slip plane arising upon movement of the cutting blade to supply an auxiliary fluid; and

supplying the auxiliary fluid in advance of the cutting blade, at the position of the failure slip plane in the soil, or sand, arising upon movement of the cutting blade (1, 5).

4,004,359

MOUTHPIECE FOR A SUCTION DREDGER

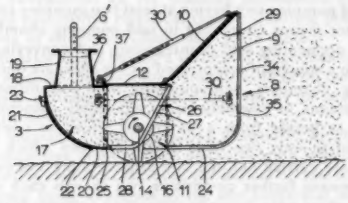
Johan Klip, Berkenwoude, Netherlands, assignor to Konijn Machinebouw B.V. and Bagger-En Constructiebedrijf Johan Klip B.V., both of Netherlands

Filed May 8, 1975, Ser. No. 575,961

Claims priority, application Netherlands, May 22, 1974, 7406867

Int. Cl.² E02F 3/88

U.S. Cl. 37—66 16 Claims



1. A mouthpiece for a suction dredger, which is adapted to be connected via a suction line to the suction side of a pump and moved by the dredger under water in an approximately horizontal direction, said mouthpiece comprising an inlet section forwardly situated in the direction of travel, which is open on the underside and which has two rearwardly converging, upwardly extending side plates; a comminuting section connected at the rear of the inlet section and also open on the underside, said comminuting section having an upper cover plate and two side plates, an approximately horizontal positively driven cutter shaft journalled in said side plates, a plurality of comminuting members mounted on said shaft each including at least one cutting blade, the blades being uniformly spaced and mutually angularly staggered on said shaft; and a suction section connected at the rear of the comminuting section and provided with a connection which, in use, is coupled to the dredger suction line, said suction section being completely enclosed between the connections to the comminuting section and the dredger suction line, said cutting blades in a downwardly pointing position projecting downwardly beyond the lower edges of the side plates of the inlet section and beyond the leading edge of the bottom wall of the suction section, the lower edges of the side plates of the inlet section and the leading edge of the bottom wall of the suction section in a working position being disposed in a horizontal plane.

4,004,360

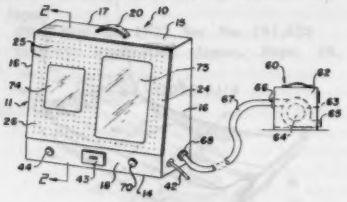
SELF-MASKING X-RAY VIEWING APPARATUS

Keith C. Hammond, 3237 W. 35th Ave., Vancouver, British Columbia V6N 2M9, Canada

Filed July 12, 1974, Ser. No. 488,161

Int. Cl.² G09F 13/10

U.S. Cl. 40—106.1 6 Claims



1. Apparatus for holding and illuminating an X-ray film comprising a light diffusing viewing screen having front and rear faces, said viewing screen being provided with a plurality of spaced air inlet holes extending therethrough between the front and rear faces, a grid alongside the rear face forming a network of light-confining and air-conducting chambers one in communication with each air inlet hole, suction means connected to the chambers to cause a flow of air through each air inlet hole and communicating chamber, lighting means near the grid for directing light through the chambers to the viewing screen, and shutter means associated with each chamber having means thereon which cooperates with air flowing in said chamber so that said shutter is normally supported in a light-blocking position, said X-ray film when placed on the front face of the viewing screen to be held thereon by atmospheric pressure blocking those air inlet holes within the borders of said film whereby only the shutter means in the chambers behind the blocked air inlet holes move to light-admitting positions.

4,004,361

VEHICLE OIL CHANGE, FILTER CHANGE AND TUNE UP REMINDER DEVICE

Harry H. McVeety, Brooklyn, N.Y., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Sept. 19, 1975, Ser. No. 614,896

Int. Cl.² G09F 11/02

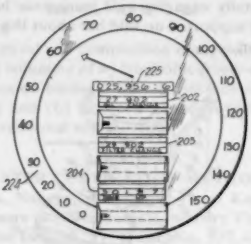
U.S. Cl. 40—77.6 1 Claim

1. A vehicle oil change, oil filter change and tune up reminder device for a vehicle having a passenger compartment a dashboard with a speedometer and odometer thereon, and an engine, said reminder device comprising

a plurality of recesses formed in the dashboard in close proximity with the speedometer in the passenger compartment of a vehicle in clear view of an operator of the vehicle;

three groups of number wheels each rotatably mounted in a corresponding one of the recesses and each comprising a plurality of coaxially mounted number wheels in next-adjacent relation in units, tens, hundreds, thousands, ten thousands and hundred thousands positions, the wheels of

a first of said groups being manually rotatable to indicate a mileage at which the next engine oil change is due, the wheels of the second of said groups being manually rotatable to indicate a mileage at which the next oil filter change is due, and the wheels of the third of said groups



being manually rotatable to indicate a mileage at which the next engine tune up is due; and

a pair of spring-biased doors each hingedly affixed adjacent a corresponding one of the recesses for selectively closing and opening the recesses.

4,004,362

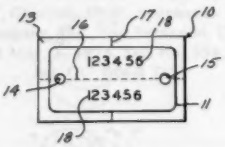
ADHESIVE WIRE MARKER

Joseph C. Barbieri, Jackson Township, Washington County, Wis., assignor to W. H. Brady Co., Milwaukee, Wis.

Filed Sept. 29, 1975, Ser. No. 617,556

Int. Cl.² H01B 7/36; G09F 3/10

U.S. Cl. 40—316 **2 Claims**



1. An adhesive wire marker assembly comprising, in combination:

a. an adhesive element having a pressure sensitive adhesive layer on one of its surfaces,

b. a backing element releasably joined to the pressure sensitive adhesive layer of the adhesive element,

c. a pair of spaced apertures extending through both the adhesive element and the backing element and adapted to receive a wire therethrough,

d. the backing element being separable from the adhesive element after a wire has been inserted through the spaced apertures and the adhesive element being foldable upon itself for joinder along the pressure sensitive adhesive layer after removal of the backing element to thereby form a flag-like marker for a wire inserted through the apertures, and

e. a perforated line defined across the adhesive element and the backing element intersecting the spaced apertures and extending through both the adhesive element and the backing element.

4,004,363

ROTATABLE CARTRIDGE CHAMBER FOR FIREARM TYPE WEAPON

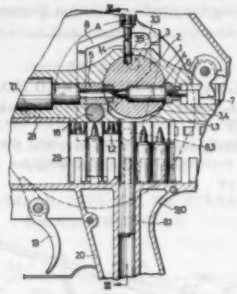
Hans Sackenreuter, Ruckersdorf, and Anton Politzer, Lauf, both of Germany, assignors to DIEHL, Nurnberg, Germany

Filed Jan. 13, 1975, Ser. No. 540,684

Claims priority, application Germany, Jan. 14, 1974, 2401543

Int. Cl.² F41C 11/00, 13/00

U.S. Cl. 42—9 **2 Claims**



1. In a firearm type weapon having barrel means with bore means therein along which projectile means is impelled when the weapon is discharged, rotatable cartridge chamber housing means at the rearward end of said barrel means having a first rotated position for presenting cartridges which include said projectile means to the said bore means, said housing means comprising a drum rotatable on an axis transverse to the plane of the bore means and having chamber means therethrough for supporting the cartridges, the axis of rotation of said drum being offset laterally from the plane of the bore means, a magazine for cartridges adjacent said barrel means, and means operable in a second rotated position of the drum for transferring cartridges from said magazine to the chamber means in said drum, said drum including a peripheral recess which faces said magazine in the first rotated position of said drum and which terminates short of said chamber means, said drum having a head portion thereon between the end of said chamber means which is remote from said barrel means and the end of said recess nearest thereto.

4,004,364

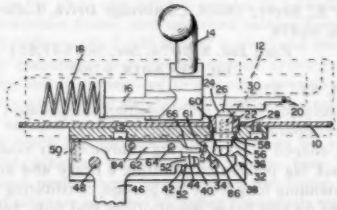
ROTATABLY MOUNTED SEAR

Raymond E. Chatigny, Gardner, Mass., assignor to Harrington & Richardson, Inc., Gardner, Mass.

Filed Jan. 20, 1975, Ser. No. 542,458

Int. Cl.² F41C 19/00, 17/00

U.S. Cl. 42—69 A **5 Claims**



1. A firearm comprising a receiver, a firing pin therein, means moving the firing pin between the firing and the cocked position, and a sear temporarily holding the firing pin in the cocked position,

said sear comprising a longitudinally movable rotatable member movable in general at right angles with respect to

the firing pin and engaging the same, a movable sear trip holding the sear in the cocked position of the firing pin, a trigger, and interengaging means between the trigger and sear trip for releasing the sear allowing the firing pin to move to the firing position,

spring means for yieldably holding the sear in the firing pin cocked position thereof,

the firing pin depressing the sear along its line of motion when the sear trip is released from its sear holding position,

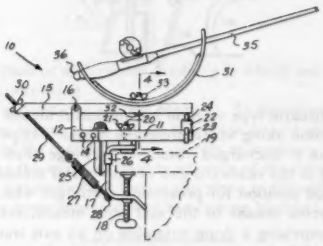
and a bushing holding the sear in position on the receiver but allowing longitudinal motion thereof.

4,004,365

SIGNALING FISHING ROD HOLDER

Lester F. Manchester, P.O. Box 1857, Clearlake Highlands, Calif. 95422

Filed July 22, 1975, Ser. No. 597,988
Int. Cl.² A01K *97/12*
U.S. Cl. 43—17 **5 Claims**



1. A fishing rod holder comprising a frame, a rod spaced above said frame in generally parallel relation thereto and pivotally secured to said frame on a transverse pivot, a generally U-shaped clamp secured to said frame in depending relation thereto, a generally arcuate bracket with a fishing rod positioned across the ends of the bracket mounted on said rod with a bolt and having an elongate slot therein to permit angular adjustment of said bracket on said rod and therefore the fishing rod, a signal switch mounted on said frame and positioned to underlie said rod, a battery actuated signal secured to said frame and electrically connected to said switch for actuating said signal upon downward movement of said rod and its attached fishing rod, and resilient means extending from said U-shaped clamp to the end of said rod opposite said switch for normally biasing said rod away from said switch to prevent actuation of said switch prior to a catch being made with said fishing rod.

4,004,366

ADJUSTABLY MOUNTED POWER FISHING REEL

Arthur E. Berry, 18645 Cambridge Drive, Lathrup Village, Mich. 48076

Filed Jan. 8, 1976, Ser. No. 647,611
Int. Cl.² A01K *97/00*
U.S. Cl. 43—27.4 **10 Claims**

1. Easily adjustable, multi-position, deep-water, power fishing-reel apparatus comprising,

an L-shaped bracket having a downwardly extending short back leg portion constituting a brace and an outwardly extending long front leg portion constituting a pole;

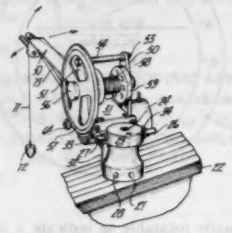
a tang on said brace remote from said pole, said tang projecting from said brace in a direction opposite to the projection of said pole;

a support mountable on a boat; a base on said support for abutting a boat; and an upstanding top portion on said support;

a transverse generally horizontal bar on said upstanding top portion of said support so as to lie spaced above a boat when said support is mounted on a boat;

said support having at least one socket aperture adjacent its said base lying spaced downwardly from said transverse bar and adapted to receive said tang on said brace;

paired stirrups extending from said bracket at a point adjacent the juncture of said brace with said pole; said stirrups extending in a direction opposite to said pole; said stirrups pivotally engaging said transverse bar so as to be swingably supported on said bar about the horizontal axis of said bar;



said bracket being swingable via said stirrups on said bar over said support from a position with said brace extending downwardly abutting said support with its said tang in said socket aperture and said pole extending in one direction (such as outwardly of a boat) to positions up to 180° opposite (such as inwardly of a boat) by pivoting said bracket and said stirrups on said bar with said pole swinging upwardly and then inwardly so that said brace swings outwardly to disengage said tang and then swings upwardly;

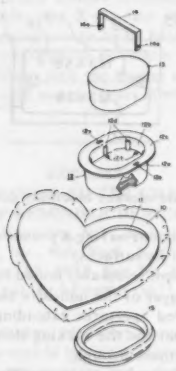
said stirrups and said tang when engaged in said socket securing said bracket against angular movement relative to said base.

4,004,367

DECORATIVE HOLDER FOR FLOWER ARRANGEMENTS

Donald L. O'Connell, Port Chester, N.Y., assignor to Floral Innovations, Inc., Port Chester, N.Y.

Filed July 11, 1975, Ser. No. 595,101
Int. Cl.² A01G *5/04*
U.S. Cl. 47—41.12 **4 Claims**



1. A decorative holder for supporting flower arrangements comprising:

a flat decorative backing piece having an opening therein;

a substantially water-confining receptacle fitting in and extending through said opening for supporting a foam block and having extension means engaging the upper surface of said backing piece;

means for retaining the foam block in a desired position in said receptacle;

and means engaging said receptacle beneath said backing piece for retaining the same in said opening.

4,004,368
AGRICULTURAL SOIL COMPOSITIONS

Paul Raymond Tully, Lowell, Mass., assignor to Cabot Corporation, Boston, Mass.

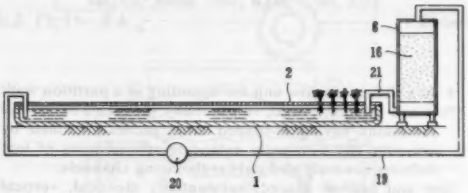
Continuation of Ser. No. 552,484, Feb. 24, 1975, abandoned. This application Jan. 15, 1976, Ser. No. 649,660
Int. Cl.² A01C 1/00
U.S. Cl. 47—58 **12 Claims**

1. An agricultural soil composition comprising a mixture of (a) one part by volumme of hydrophobic finely-divided particulate metallic oxide having a BET-N_2 surface area of at least about 50 m^2/g and (b) between 15 and about 40 parts by volume of conventional soil material.

4,004,369
WATER CULTIVATION METHOD

Hisayoshi Kato, Nagoya, and Ryuhji Ueno, Kasugai, both of Japan, assignors to Nihon Jescoal Industry Co., Ltd., Japan

Filed Dec. 30, 1974, Ser. No. 537,424
Int. Cl.² A01G 31/00
U.S. Cl. 47—62 **5 Claims**

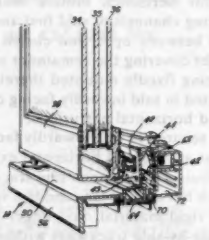


1. In a method of cultivating plants hydroponically wherein said plants are supported so that the roots of said plants are maintained in an aqueous nutrient solution and the tops of said plants are maintained above said solution whereby said plants are grown by means of water containing nutrients, substantially in the absence of soil, the improvement comprising adding activated carbon to said water, whereby organic substances harmful to said plants are adsorbed by said carbon and the growth and quality of said plants are improved.

4,004,370
INSULATED DOOR MOUNTING FRAME STRUCTURE

James J. Heaney, Glendale, Calif., assignor to Anthony's Manufacturing Company, Inc., San Fernando, Calif.

Filed Mar. 3, 1975, Ser. No. 554,593
Int. Cl.² E06B 7/12
U.S. Cl. 49—70 **15 Claims**



1. A structural member for use in forming a door mounting frame for mounting into an opening in a refrigerated cabinet and within which frame a door can be operatively mounted, said structural member being a beam elongated in the longitudinal dimension and defined by its cross-section which comprises:

a. an elongated jamb portion adapted to abut the refrigerated cabinet opening;

b. an elongated buck portion extending perpendicularly from the longitudinal edge portion of said jamb portion adapted to be nearest the interior of the refrigerated cabinet, said buck portion comprising:

i. an elongated, relatively thick structural load bearing member

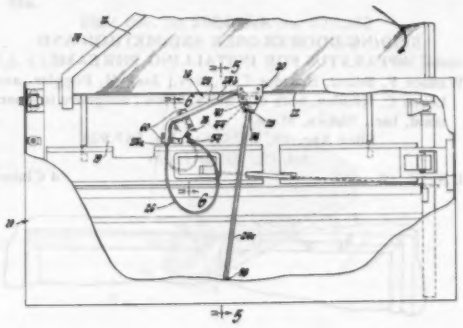
ii. an elongated relatively thin faceplate adapted to coact in sealing relationship with the refrigerated cabinet door, said load bearing member and faceplate being disposed in mutually spaced relationship to define a divided thermal path in said buck portion;

c. a thermal isolation element positioned within said structural member in the area proximate the junction of said jamb and buck portions and thermally insulating the structural member components on opposite sides thereof.

4,004,371
WINDOW REGULATOR MECHANISM

Edward G. Podolan, Utica, and Lawrence A. Surhigh, Warren, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed May 9, 1975, Ser. No. 575,953
Int. Cl.² E05F 11/48
U.S. Cl. 49—352 **5 Claims**



1. For use with an automotive door having spaced inner and outer panels and a window frame, and a window pane adapted to being slidably mounted in said window frame, a window regulator mechanism comprising an actuator assembly mounted in said door on said inner panel; a bracket assembly mounted on said window pane adjacent the bottom edge thereof; a track having a slotted opening formed along the full length of one side thereof and including first, second, and third sections mounted in said door on said inner panel, said first section being secured so as to have said slotted opening positioned adjacent said actuator assembly in a forward portion of said door and extending substantially vertically downwardly from said actuator assembly, said second section being connected at one end thereof to the upper end of said first section and extending from said actuator assembly to said bracket assembly when said window pane is in a closed position in said window frame, and said third section being connected to the other end of said second section and extending downwardly therefrom in a predetermined arcuate-shaped configuration and being secured to a bottom portion of said inner panel; a plastic tape slidably mounted in said track and having one end portion thereof extending from the open end of said first track section and looped so as to be secured adjacent said actuator assembly, said plastic tape having equally-spaced perforations formed along the entire length thereof; said actuator assembly including a manually rotatable actuating shaft, a pinion gear mounted on said actuating shaft for rotation therewith, a fixed ring gear retainer, a ring gear rotatably mounted on said ring gear retainer and having internally-formed teeth meshing with said pinion gear and externally-formed sprocket teeth meshing with said perforations through said slotted opening in said track for slidably reciprocally moving said plastic tape through said first, second, and

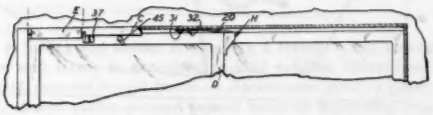
third track sections; and said bracket assembly including a first plate member secured to said bottom edge of said window pane at a central location therealong and including a portion extending beyond said bottom edge, a second plate member secured at one end thereof to said extended portion and including a first flange portion formed on the other end thereof so as to extend substantially perpendicular to the plane of said second plate member, a first rectangular-shaped opening formed in said first flange portion, a second flange portion formed on said first flange portion adjacent an edge of said first rectangular-shaped opening so as to extend substantially perpendicular to the plane of said first flange portion, a second rectangular-shaped opening formed in said second flange portion, a flanged drive pin secured to the other end portion of said plastic tape in said third track section and extending therefrom into said second rectangular-shaped opening to drive said bracket assembly and, hence, said window pane along a path parallel to said third track section intermediate said door panels in response to manual rotation of said actuating shaft.

4,004,372

SLIDING DOOR CLOSER AND METHOD AND APPARATUS FOR INSTALLING THE SAME

Wallace F. Beard, Boulder City, Nev.; Jack H. Poppler, and Loren C. Kienlen, both of Nisswa, Minn., assignors to Doormaid, Inc., Nisswa, Minn.

Filed Apr. 14, 1975, Ser. No. 567,928
Int. Cl.² E05D *15/06*
U.S. Cl. 49—404 **4 Claims**



1. A cushioned door closer for a sliding door having top and bottom edges and a pair of vertical edges, one an overlapping edge and the other an abutting edge and mounted in an upper channel having a horizontal top portion spaced above the top of the door and provided with depending guide flanges which capture the upper edge portion of the door, said door closer comprising,

a closer housing with a pivot shaft therewithin attached to the upper portion of the overlapping edge of the sliding door,

a coil return spring having the coil thereof journalled on said shaft and enclosed within said housing and having a free end attachable to the horizontal top portion of the channel member in substantially concealed relation above the upper edge of the door between the depending guide flange of the channel,

means for cushioning the door during the final stages of movement under the force exerted by said return spring and including an extensible rod member with means for limiting the speed of retraction thereof,

a rod extending member mounted on said door for moving said rod into extended position whenever the door is moved into open position,

a magnet attached to one of said members and a ferrous metal magnet-engaging portion mounted on the other member in alignment with said magnet for engagement therewith to pull the extensive member into fully extended position, and

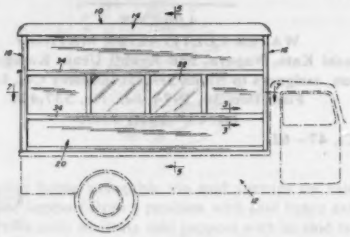
stop means for limiting the extending movement of the extensible member and the two members separating when the extensible member has been pulled into fully extended position against said stop means and thereafter the door is moved further into open position.

4,004,373

EXTRUSIONS FOR PARTITIONS, WALLS AND ENCLOSURES

Robert C. Eschbach, Newport Beach, and John B. Colligan, Glendale, both of Calif., assignors to Aztec Manufacturing Company, Monrovia, Calif.

Division of Ser. No. 325,461, Jan. 22, 1973, Pat. No. 3,866,381, which is a division of Ser. No. 884,812, Dec. 15, 1969, Pat. No. 3,712,005. This application Dec. 30, 1974, Ser. No. 537,477
Int. Cl.² E05D *15/06*
U.S. Cl. 49—413 **5 Claims**



1. In a sliding window unit for mounting in a partition wall;

first and second spaced, substantially identical, horizontal extrusions having H-shaped cross sections defined by inwardly and outwardly extending spaced pairs of legs defining inwardly and outwardly facing channels;

first and second spaced, substantially identical, vertical extrusions each having inwardly extending spaced legs and an outwardly extending spaced pair of legs defining first and second inwardly facing channels and a first outwardly facing channel, respectively, said horizontal and vertical extrusions being interconnected to form a rectangular window frame having a central opening;

partition securing means on the outwardly extending legs of said horizontal and vertical extrusions for securing said window frame in a partition, said outwardly facing channels being adapted to receive said partition;

first and second parallel slots formed in the adjacent inwardly extending legs forming said first channel on each of said vertical extrusions;

a sealing member disposed in each of said parallel slots, said sealing members being disposed on opposite sides of each of said first channels of said vertical extrusions;

first and second window lights mounted in said central opening of said window frame, said first light covering approximately one-half of said central opening and being mounted for horizontal motion therein along said inwardly facing channels of said first and second horizontal extrusions between open and closed positions, and said second light covering the remainder of said central opening and being fixedly mounted therein, said second light being located in said inwardly facing channels of said first and second horizontal extrusions;

track means secured in said inwardly facing channel of each of said first and second horizontal extrusions, for receiving said window lights, each said track means comprising a track web having a center and two spaced outside finger flanges of rigid material, said finger flanges forming two parallel side-by-side trackways within the inwardly facing channel of each said horizontal extrusions, said first and second window lights being mounted in separate corresponding trackways;

flexible sealing means formed at and extending from the ends of each of said finger flanges to engage opposed surfaces of said window lights;

a rigid, elongated block within each of the trackways formed in the lowermost of said first and second horizontal extrusions, said blocks each having on the upper surface thereof a longitudinal recess for receiving and supporting a corresponding window light; and

inner and outer vertical center posts, said outer post being fixedly mounted within said frame and being secured to one end of said second window light while the opposite end of said second light engages the sealing members of the first channel of the first one of said vertical extrusions whereby said second window light is secured in said frame, said inner post being movably mounted within said frame and being secured to one end of said first window light while the opposite end of said first window light is engagable with the sealing members of the first channel of the second one of said vertical extrusions when said first window light is moved to its closed position.

4,004,374

DESCALING BENT ROD WITH SEPARATED CLEANING PARTICLES

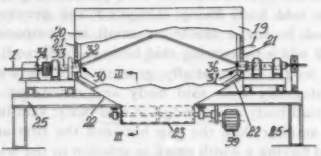
Joseph Johannes Maria Annegarn, 1 Walsh Road, Kilfenora, Benoni, Transvaal, South Africa

Filed Aug. 6, 1975, Ser. No. 602,299

Claims priority, application South Africa, Aug. 7, 1974, 74/5031

Int. Cl.² B08B *7/04*; B24C *1/00*, *3/14*

U.S. Cl. 51—5 A **11 Claims**



3. Rod descaling means comprising an enclosure having spaced inlet and outlet openings therein, first means for distributing separated cleaning particles in said enclosure, second means for forming a bent portion in a rod extending between said openings and rotating the bent portion in an approximately circular path such that said bent portion strikes the particles in said enclosure, and third means for moving the rod through the enclosure between the openings and maintaining the bent portion in the enclosure.

4,004,375

APPARATUS FOR CONTINUOUS CLEANING OF A HONING TOOL

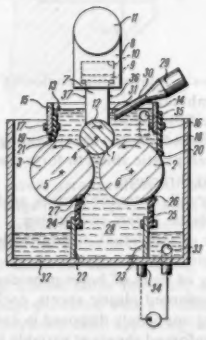
Karl Wieck, Stuttgart, Germany, assignor to Supfina Maschinenfabrik Hentzen KG, Remscheid, Germany

Filed July 25, 1975, Ser. No. 600,882

Claims priority, application Germany, July 25, 1974, 2435848

Int. Cl.² B24B *7/00*

U.S. Cl. 51—59 SS **3 Claims**



1. In a device for superfinishing a cylindrical workpiece including means for holding and supporting said workpiece and including a honing tool which contacts a cylindrical surface of said workpiece with its working surface under a predetermined pressure and including reciprocating driving means for imparting to said honing tool a reciprocating motion in a direction parallel to the axis of rotation of the workpiece, and further including ultrasonic driving means with a transmitter head for imparting an oscillatory motion to the honing tool in a direction perpendicular to the first mentioned reciprocating motion,

the improvement comprising:

container means surrounding the workpiece and the workpiece-contacting surface of the honing tool, said container means being filled with a liquid, the transmitting head of said ultrasonic driving means being immersed below the surface of said liquid; whereby said liquid serves as a medium for transmitting ultrasonic vibrations to the workpiece-contacting surface of the honing stone.

4,004,376

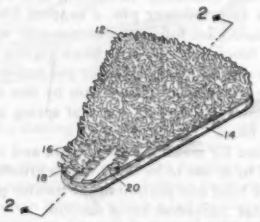
KITCHEN WARE CLEANING DEVICE

Edwin F. Schepp, Creve Coeur, Mo., and Ronald B. Coffey, Raleigh, N.C., assignors to Monsanto Company, St. Louis, Mo.

Filed Dec. 30, 1974, Ser. No. 537,282

Int. Cl.² B24D *15/04*; A47L *17/04*

U.S. Cl. 51—181 R **4 Claims**



1. A laminar structure useful as a device for cleaning cooking vessels and other utensils used in food preparation, said laminar structure comprising: a molded thermoplastic brushing surface characterized by a base member from which a plurality of projections extend vertically from one face thereof at angles of from 60° to 90°, and wherein said projections are integrally fused with said base member; said laminate structure further including a non-woven, nylon mat which is bonded to the base member of said thermoplastic brushing surface on the face thereof opposite to that from which the projections extend, said non-woven, nylon mat having particles of an abrasive and soap impregnated therein.

4,004,377

MACHINE FOR FORMING A LOCATOR PIN

Richard D. Laudick, 314 E. Lyon, Lyons, Kans. 67554

Division of Ser. No. 467,464, May 6, 1974, Pat. No. 3,918,694.

This application June 9, 1975, Ser. No. 585,086

Int. Cl.² B24B *47/10*

U.S. Cl. 51—232 **1 Claim**

1. A machine for making a locator pin or the like, the machine comprising:

a base rigidly mounted;

a pair of parallel rails mounted on said base;

a cam follower rigidly secured to one of said rails;

an elongated housing having ends, and movably mounted on said rails, the movement of said housing transverse to the length of said housing;

a shaft rotatably mounted in said housing and parallel to the length of said housing;

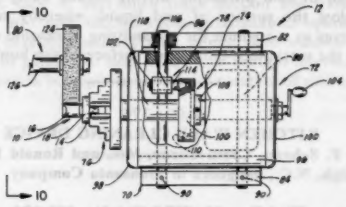
a cam mounted on said shaft, said cam having a grooved

portion therein, said cam follower slidably engaged in the grooved portion of said cam;

a chuck secured to one end of said shaft for engaging the locator pin and rotating the pin thereon; and

a crank or the like attached to the other end of said shaft for rotating said shaft;

said base is an elongated U-shaped base having a bottom portion and two side portions, said parallel rails mounted at the ends thereof to the side portions of said base, said rails suspending said housing between the side portions of said base, the length of said housing parallel to the side portions of said base, the ends of said housing extending outwardly from the side portions of said base, said hous-



ing encloses said cam, said cam follower, and a portion of said shaft, said grooved portion of said cam is generally annular and eliptically elongated, said cam follower includes a cam follower pin, a support block, and a leaf spring, said cam follower pin movably mounted in said support block, said support block rigidly secured to one of said rails, said cam follower pin resiliently urged into the grooved portion of said cam by one end of said leaf spring, the other end of said leaf spring attached to said support block,

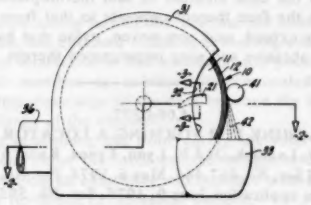
said machine for making a locator pin and constructed and adapted to in use to be used with a grinder or the like to grind the head end portion of the locator pin or the like to an annular transverse cross section.

4,004,378

GRINDING WHEEL WITH INTEGRAL BLOWER

Van Q. Maxey, Morgan Hill, Calif., assignor to Engelhard Minerals & Chemicals Corporation, Murray Hill, N.J.

Filed July 18, 1975, Ser. No. 597,021
Int. Cl.² B24B 55/06; B24D 5/10
U.S. Cl. 51—273 **9 Claims**



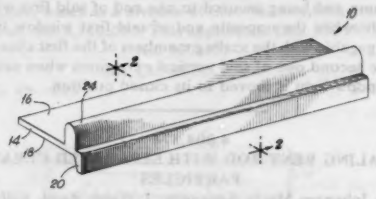
5. In a grinding wheel for removing material from a workpiece engaged by the outer periphery of the wheel: a generally cylindrical inner portion adapted to be rotated about its axis, an abrasive cutting portion disposed coaxially of the inner portion and defining the outer periphery of the wheel, and at least one blower passageway having a continuous wall extending in an axially inclined direction between axially spaced sides of the wheel for drawing air and material removed from the workpiece through the wheel when the wheel is rotated in a predetermined direction, said passageway being spaced inwardly of the outer periphery and opening through the sides of the wheel without opening through the periphery.

4,004,379

SCRATCH PREVENTER

Gerald Castagna, P.O. Box 62, Cedar Point, Ill. 61316

Filed Apr. 14, 1975, Ser. No. 568,122
Int. Cl.² B24B 55/00
U.S. Cl. 51—274 **1 Claim**



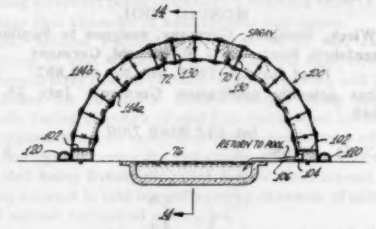
1. A scratch preventer for protection of a first automobile body panel during repair of an adjacent second body panel separated from the first panel by an elongated, narrow gap, said scratch preventer comprising: a unitary, one-piece body of substantially homogeneous, flexible, resilient, elastomeric and magnetic material; said body being magnetized for retention against the first automobile body panel solely by magnetic attraction; said body being elongated and generally panel-shaped and having a thickness small in comparison to its length and width permitting said body to be flexed; said body having a length substantially greater than its width; a lip formed integrally with said body and extending along the length of said body at one edge of said body; said lip having a thickness smaller than the gap between the first and second panels and having a width small in relation to the width of said body; and a bumper formed integrally with said body on the opposite side of said body from said lip, said bumper and lip being generally parallel with one another, and said bumper being thicker than said lip.

4,004,380

DOUBLE WALLED INFLATABLE STRUCTURES

John P. Kwake, 2507 Carob Drive, Los Angeles, Calif. 90046

Continuation-in-part of Ser. No. 304,550, Nov. 7, 1972, abandoned. This application July 8, 1974, Ser. No. 486,493
Int. Cl.² E04B 1/345
U.S. Cl. 52—2 **3 Claims**



1. A double walled inflatable enclosing structure, which comprises, in combination:

a first reinforced plastic sheet;

a second reinforced plastic sheet sealing attached to said first reinforced plastic sheet to form the roof and walls of said enclosing structure;

means for internally interconnecting said first and second reinforced plastic sheets comprising:

a. a plurality of individual, substantially non-stretchable, flexible, cord means,

b. a plurality of pairs of holes provided in said first and second reinforced plastic sheets, each hole of a pair of holes being oppositely disposed in each of said first and second reinforced sheets at variable but predetermined distances from an adjacent pair of holes,

c. the ends of each of said individual flexible cord means passing through each pair of holes and said ends being provided with enlarged ends so as to prevent their slipping inwardly through the holes whereby said plurality of cord means interconnects, and is supported entirely by, said first and second reinforced plastic sheets at the variable but predetermined distances from each other determined by the location of said plurality of said pairs of holes, and

d. a plurality of washer means provided between the enlarged ends of each of said cord means and said first and second reinforced plastic sheets to prevent tearing of the underlying holes;

means for air sealing said structure at areas adjacent the said enlarged ends of each of said cord means;

an air blower means adapted to blow air into said enclosed structure and cause it to be inflated, said plurality of flexible cord means becoming taut and determining the configuration of said enclosed structure when said enclosed structure is fully inflated and said plurality of flexible cord means lying loosely within said enclosed structure when said enclosed structure is not inflated;

fluid inlet means between said first and second reinforced plastic sheets, at at least one elevated point within said enclosing structure;

fluid supply means connected to said fluid inlet means; and

temperature-responsive valve means at a low point in said enclosure for permitting fluid, entering the fluid inlet means from said fluid supply means, to exit from said enclosing structure.

4,004,381

ARRANGEMENT FOR A PROTECTIVE COVER FOR THE EDGE OF SHEET METAL PANELS

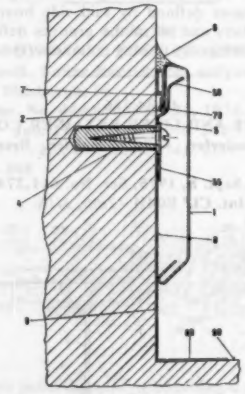
Peter Pichler, Waldheim, and Albert Jorg, Hergiswil, both of Switzerland

Filed Feb. 27, 1973, Ser. No. 336,321

Claims priority, application Switzerland, Feb. 29, 1972, 2918/72

Int. Cl. E04d *1/36, 13/15*

U.S. Cl. 52—60 **1 Claim**



1. A protective cover arrangement for a sheet metal panel for protecting the edge thereof lying against a wall, comprising a clamping strap extending transversely of the edge of the sheet metal panel to be protected, means for securing said clamping strap to the wall, said clamping strap including a flexible upper leg spaced from the wall, and a cover strip having an upper edge provided with a U-shaped channel bent portion received between said upper leg and the wall, said bent portion of said cover strip being provided with an elastic seal partially received in said U-shaped channel bent portion, said seal being tubular in shape having a lateral flap with said flap being received in said U-shaped channel bent portion, the space between the wall and said cover strip above said seal being filled with sealing compound the lower edge portion of said cover strip being U-shaped and extending toward the wall, said clamping strap being secured to the wall above the edge of the sheet metal panel, said clamping strap overlying the edge of the sheet metal panel in order to press the sheet metal panel against the wall, said clamping strap having approximately the same length as said cover strip.

4,004,382

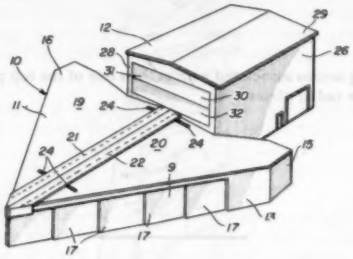
HANGAR FACILITY

Carl V. Carlson, Batavia, Ill., assignor to R & D Constructors, Inc., Park Ridge, Ill.

Filed May 30, 1975, Ser. No. 582,369

Int. Cl.² E04B *1/346*

U.S. Cl. 52—64 **11 Claims**



1. A hangar for storing and maintaining aircraft, said hangar comprising:

a first fixed section for housing the fuselage and wing portions of an aircraft which includes a fixed roof having an opening therein through which a tail section of an aircraft can pass when an aircraft is moved into or out of said hangar; and,

a second hangar section for housing the tail section of said aircraft said second section being contiguous to said first section and having a roof which is greater in height than the height of the roof of said first section and of a height sufficient to accommodate the height of the tail of an aircraft to be stored or maintained.

4,004,383

METHOD AND DEVICE FOR ANCHORING A STRUT

Tsuguhiko Watanabe, No. 5-13, 1-chome, Ehara-cho, Nakano, Tokyo, Japan

Filed Sept. 12, 1975, Ser. No. 612,683

Claims priority, application Japan, Nov. 8, 1974, 49-128106; May 19, 1975, 50-65922[U]; July 29, 1975, 50-104165[U]

Int. Cl.² E04H *12/20, 17/22*

U.S. Cl. 52—154 **5 Claims**

1. A method of anchoring a strut in the ground, comprising the steps of

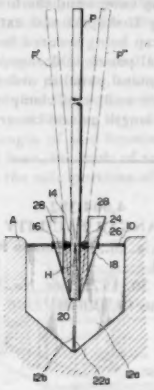
connecting upright radial plates to the underside of a top plate provided with a hole so that said upright radial plates provide bearing surfaces resisting against side and vertical pressures;

driving said radial plates into the ground at a given location until said top plate engages and compacts the ground beneath it;

inserting the strut through the hole into the thus compacted ground until a lower end of the strut abuts against a bearing surface provided in the radial plates; and

adjusting the strut to a desired angular orientation relative

to the horizontal by engaging and exerting pressure upon the strut with respective circumferentially spaced clamping means associated with at least one of the top plate and the radial plates.



4,004,384

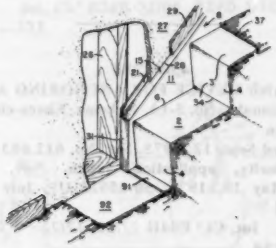
STAIRWAY UNIT

Murray C. Hood, Oakland, Calif., assignor to Curoco, Albany, Calif.

Filed Feb. 6, 1976, Ser. No. 655,961

Int. Cl.² E04F *11/12*

U.S. Cl. 52—188 **3 Claims**



1. A stairway unit comprising:

a. a single sheet metal member forming the treads and risers and having parallel side edges;

b. a pair of stringers each having a planar, vertical-face side;

c. said sheet metal member being connected at its edges only to the vertical-face sides of said stringers; and

d. a plurality of axially aligned channel-shaped brackets connected to the underside of a plurality of said treads having a laterally extending base joined on their outer sides to said treads and integrally connected downwardly extending flanges adapted for bendably engaging a furring strip.

4,004,385

BUILDING STRUCTURE USING CONCRETE BLOCKS

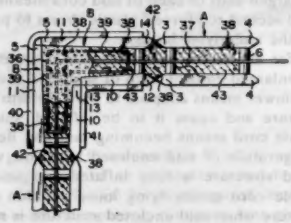
Momotoshi Kosuge, No. 834-9, Kitaishigaki, Beppu, Oita, Japan

Filed Apr. 10, 1974, Ser. No. 459,725

Claims priority, application Japan, Apr. 17, 1973, 48-46207[U]; May 8, 1973, 48-53905[U]; Apr. 26, 1973, 48-50473[U]

Int. Cl.² E04B *1/82, 2/02*

U.S. Cl. 52—259 **10 Claims**



1. A building structure comprising (i) a plurality of contiguous concrete blocks spaced in an end to end relationship, said blocks comprising two rectangular side boards spaced from and extending parallel to each other, each said side board having at least one V-shaped vertical edge, said V-shaped edge abutting the V-shaped edge on an adjacent block, and connecting members integrally connecting said side boards wherein the side boards of at least one of said plurality of blocks are of different lengths and have respective V-shaped vertical edges aligned with each other and wherein the shorter side board has one flat vertical edge, the height of said connecting members being less than the height of said boards, such that the top of each of said connecting members is at a lower level than the top of each of said boards; (ii) horizontally extending reinforcing bars situated within the space between said side boards above the top of said connecting members; (iii) vertically extending reinforcing bars situated within the space formed by said side boards and said connecting members; (iv) reinforcing loops positioned in the space formed by said side boards and said connecting members and surrounding said vertically extending reinforcing bars; and (v) mortar in the spaces defined by said side boards and said connecting members and all of the grooves defined by said V-shaped edges, integrally uniting members (i) – (iv).

4,004,386

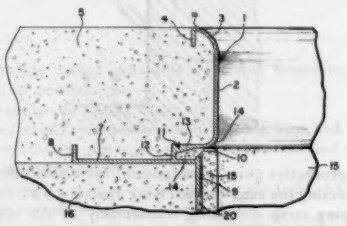
CONCRETE AND LINER RETAINER COPING

Harold C. Diffenderfer, 4196 Bannister, Breesport, N.Y. 14816

Filed Sept. 8, 1975, Ser. No. 611,274

Int. Cl.² E04H *12/00, 3/18*

U.S. Cl. 52—300 **3 Claims**



1. A concrete and liner retaining coping for mounting on the top surface of a pool wall and the like comprising:

a flat vertical wall terminating upwardly in a top arcuate curve portion curving rearwardly in a direction away from the pool and formed with a vertically downwardly

depending lip substantially parallel to said vertical wall and ending in a free edge;

a horizontal portion for support on the top surface of the pool wall and extending rearwardly relative to said vertical wall and terminating at its free end in an upwardly directed vertically orientated back lip, said horizontal portion having on its opposite end a downwardly directed flange covering the edge of the top surface and an upwardly directed lip for retaining the liner.

said vertical wall terminating downwardly in a bottom arcuate curve portion curving rearwardly overlying a part of said horizontal portion and the downwardly directed flange defining a receptacle opening for receiving the liner; and

a vertical connection portion integrally joining said horizontal portion to the bottom arcuate curve portion of said vertical wall and forming the back wall of said receptacle.

4,004,387

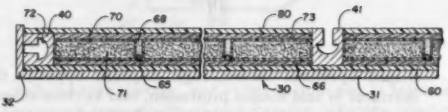
PANELS AND THE METHOD OF SAME FOR HOUSE CONSTRUCTION

Jerome B. Ellingson, R.R. 1, Moorhead, Minn. 56560

Filed Aug. 20, 1975, Ser. No. 606,109

Int. Cl.² E04C *1/00*; **B28B** *9/00*; **B28H** *9/02*

U.S. Cl. 52—309.3 **15 Claims**



8. The prefabricated panel including, an outer layer of fiberglass mat having a suitable facing material secured thereto; an inner core of insulating material extending in spaced rows across the width of the panel, a metal rod positioned in the space between each row of insulating material and secured to the insulating material and the outer layer of fiberglass mat by acrylic and filler material; and a top layer of fiberglass material secured to the insulating material and bonded thereto by an acrylic material.

4,004,388

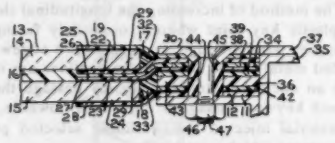
WINDOW PANEL EDGE CONSTRUCTION

John E. Stefanik, Lower Burrell, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 444,440, Feb. 21, 1974. This application Jan. 21, 1975, Ser. No. 542,749

Int. Cl.² E04C *1/42, 2/54*

U.S. Cl. 52—398 **13 Claims**



1. A window panel assembly comprising a rigid transparent sheet for mounting in an opening on a supporting structure having a mounting surface including mounting surface portions of a given contour, said sheet having a peripheral edge and a peripheral marginal major surface area on each side of said sheet adjoining said edge, portions of said peripheral marginal major surface area on one side of said sheet being adapted to be mounted in substantially coplanar alignment with said mounting surface portions, a pair of rigid molded strap members composed of a reinforced, thermosetting resin that is cured during lamination of said assembly, one of said strap members being rigidly adhered to said marginal major surface area on said one side of said sheet and extending outwardly from said edge and the other of said strap members being rigidly adhered to said marginal major surface area on the other side of said sheet and extending outwardly from said edge and said strap members being connected outwardly of said edge of said sheet in a rigid structural edge attachment member having an outer portion molded to fit on said supporting structure around said opening whereby said sheet may be fastened through said strap members to said supporting structure to form a rigid assembly with a minimum of residual stress.

4,004,389

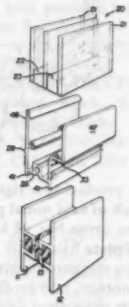
GLAZING ADAPTOR

Joseph DiFazio, Troy, Mich., assignor to Acorn Building Components, Inc., Detroit, Mich.

Continuation-in-part of Ser. No. 607,142, Aug. 25, 1975. This application Dec. 1, 1975, Ser. No. 636,534

Int. Cl.² E04B *1/62*

U.S. Cl. 52—398 **9 Claims**



1. In combination with a window frame having a frame opening of a first width, the improvement of a universal glazing adaptor to be inserted into said frame opening said first width to receive a double-pane thermally sealed glass panel or the like, said adaptor for receiving a triple-pane-thermally sealed glass panel or the like, comprising:

a rigid frame-engaging portion of double-pane width insulating material for insertion into said frame opening at least part of said frame engaging portion being wider than said first width; and

a rigid receptacle portion of triple-pane width insulating material, integral with and extending upwardly from said frame-engaging portion for receiving and frictionally retaining a triple-pane-thermally sealed glass panel;

said adaptor including a base at one end of said frame-engaging portion so that said adaptor is U-shaped in cross section, whereby when said glass panel is inserted in said receptacle portion and thereafter said frame engaging portion inserted into said frame, the frictional fit between said frame and said frame-engaging portion tightens the frictional fit between said glass panel and said receptacle portion.

4,004,390

SUPPORTING STRUCTURE WITH STRIP GRID PROFILE BARS FOR WALL OR CEILING COVERINGS

Günther Merkwitz, Freudenberg, Germany, assignor to Odenwald Faserplattenwerk G.m.b.H., Amorbach, Germany

Filed Dec. 5, 1974, Ser. No. 529,730

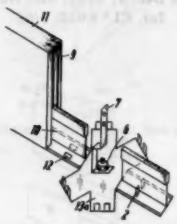
Claims priority, application Germany, July 26, 1974, 2435978

Int. Cl.² E04B *5/52*

U.S. Cl. 52—484 **7 Claims**

1. In a supporting structure for a suspended ceiling having

nodal plates suspended from above and provided with a plurality of radiating arm-like extension pieces supportively engaging a plurality of T-shaped strip grid profile bars, means for rigidly locking the profile bars to the respective associated extension pieces of the nodal plates, comprising a plurality of upwardly bent locking projections extending from the outward end of each of said extension pieces, and the cross-bar of the T of each of said profile bars adjacent the end thereof associated with the respective engaging extension piece being provided with an equal plurality of slots adapted to receive said projections of said respective extension piece, such that when the ends of said profile bars are disposed in overlying engagement with the respective extension pieces said projections are engageable in and extendable through and above the respective slots of the associated profile bars, the portions of said projections extending above said slots being adapted to be longitudinally bent over on the cross-bar of the T of the associated profile bar for producing a rigid connection, and each extension piece of each of said nodal plates being respectively equal in width to the cross-bar of the T of the associated profile bar said nodal plate having six of said extension pieces which are disposed in a staggered relationship, each one at 60° with respect to one another, said profile bars being adapted to support vertical panels in vertical adjustment relation thereto and characterized, in that said extension pieces extend outwardly from the boundary of a middle portion of a respective nodal plate, in that a vertical wall profile member of hexagonal cross-section is provided which is adapted to be fitted on said nodal plate so that the ends of its six walls lie on said boundary, in that at least one of said walls is provided with two outwardly-extending vertical ribs, and in that the panels associated with said profile bars are provided with vertically-extending slot-like recesses cooperatively engageable with said ribs.



4,004,391

METHOD AND A PANEL FOR PRE-FABRICATING BUILDINGS

John Herbert Keeton, P.O. Box 278, Taylor Blvd., Campbellsville, Ky. 42718

Continuation of Ser. No. 331,708, Feb. 12, 1973, abandoned. Division of Ser. No. 127,202, Mar. 23, 1971, abandoned. This application Oct. 30, 1974, Ser. No. 519,191

Int. Cl.² E04C *1/10, 1/30*

U.S. Cl. 52—584 **4 Claims**

1. A building panel for constructing building walls and the like comprising

a. a first side edge comprising an elongated wall adapted to cooperate with an elongated wall of a second side edge of a like building panel,

b. a second side edge, opposite said first side edge, comprising an elongated wall adapted to cooperate with an elongated wall of a first side edge of a like building panel,

c. a tongue protrusion extending substantially along the length of said elongated wall of said first side edge, and having a plurality of spaced apart apertures disposed therein,

d. a groove extending substantially along the length of said elongated wall of said second side edge, and having a plurality of spaced projections formed on the surface thereof for cooperation with apertures in a tongue protrusion of a like building panel, and

e. locking means carried by said tongue protrusion for engaging projections of a like building panel when the latter are inserted into said apertures in said tongue protrusion and for preventing withdrawal of the projections from the apertures, said locking means comprising an elongated substantially flat slide member extending along the length of said tongue protrusion and in slidable engagement therewith, said slide member having keyhole-shaped apertures therethrough disposed opposite the apertures in said tongue protrusion, said keyhole-shaped apertures having portions of enlarged area about equal to the area of the apertures, said slide member being movable longitudinally from a first position in which the projections of a like panel may pass through said apertures to a second position in locking engagement with the projections of a like panel, said slide member having an end which extends beyond the end of said elongated wall of said first side edge so as to be accessible for actuation after tongue and groove engagement of said first side edge with a second side edge of a like panel.

4,004,392

MOLDED PLASTIC KEY MOLDED JOINT AND METHOD OF FORMING SAME

Robert W. Shepard, La Mesa, and George R. Heffner, University City, both of Calif., assignors to Rohr Industries, Inc., Chula Vista, Calif.

Filed June 2, 1975, Ser. No. 582,596

Int. Cl.² E04C *1/10, 1/30*

U.S. Cl. 52—436 **6 Claims**

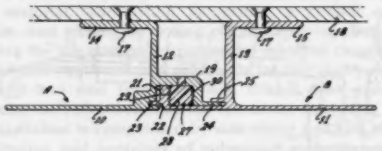
1. The method of increasing the longitudinal shear strength of a plastic key joint wherein oppositely facing, relatively overlapping, straight edge portions of two edgewise adjacent extruded metal stakes, which edge portions are interfitted to define an enclosed, straight, keyway passage therebetween, and such keyway passage is filled with flowable, hardenable key material injected therein under selected pressure, the improvement which comprises:

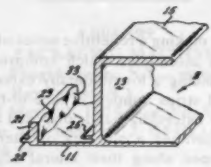
deforming edge portions of both of said strakes which define laterally opposite sides of such keyway passage in undulating patterns extending longitudinally of such passage prior to the introduction of the key material into the keyway, whereby the flowable key material fills the undulating patterns of the keyway, and, upon hardening, strongly resists relative movement of the two strakes longitudinally of such passage.

6. In a plastic key interlock joint joining in edge-to-edge relation, the straight sides of two relatively thin, straight, extruded, aluminum plate members of the type wherein, following an initial hooked engagement of the joined edges of the two plate members, movement of the plate members edgewise

together completes the joint and opens up a key forming passage within the joint, which passage is then filled with flowable, hardening, key forming material, the improvement which comprises:

an embossed pattern formed in the portions of said strakes defining at least two opposed, otherwise straight sides of such passage, each of which patterns extends longitudinally of such passage, and varies in direction in selected sequence transversely of such passage, whereby relative displacement in shear of the two plate members lengthwise of such passage creates compressive forces on the key material located between such patterned side portions throughout a substantial portion of the entire length of such joint passage.





4,004,393

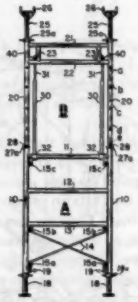
ADJUSTABLE HEIGHTH SHORING

Ronald G. Morris, Beaver Falls, Pa., assignor to Beaver-Advance Corporation, Ellwood City, Pa.

Filed Nov. 28, 1975, Ser. No. 636,208

Int. Cl.² E04H *12/00*; **E04G** *7/00*

U.S. Cl. 52—637 **11 Claims**



1. In an adjustable heighth scaffold having substantially rectangular upper and lower sections, each section having a pair of horizontally spaced-apart upright end frames, each end frame having a pair of tubular transversely spaced-apart upright primary supporting leg members, and the lower ends of the leg members of the upper section being adapted to telescopically adjustably fit with the upper ends of the leg members of the lower section, the improvement which comprises: a horizontal connector member integrally secured to and extending across between the pair of supporting leg members of each end frame of one of said sections adjacent an upper end portion thereof, a pair of horizontal cross-extending members integrally secured to and positioned in a vertically spaced-apart relation with respect to each other between the pair of supporting leg members of each end frame of the other of said sections adjacent an upper end portion thereof, a pair of shorter length leg members extending vertically across and being integrally secured between each said pair of cross-connecting members, each said pair of shorter length leg members being positioned in an adjacent inwardly spaced relation with respect to an associated supporting leg member of its frame, latch pin means secured on each of said shorter length leg members, a pair of cross brace members for detachably connecting each end frame of the one section with an opposite end frame of the other section, each of said cross brace members being provided with a swing bracket latching means at one end thereof and a latching arm at the other end thereof having a group of lengthwise spaced-apart latching hole portions, said swing bracket latching means being adapted to pivotally engage on said connector member of one end frame of said one section, and said latching arm being adapted to have one of its latching hole portions latch-engage said latch pin means of the opposite end frame of said other section.

4,004,394

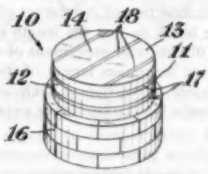
METHOD FOR INSULATION OF CURVED SURFACES

Robert B. Bennett, Freeland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Oct. 15, 1974, Ser. No. 514,682

Int. Cl.² E04B *2/04*

U.S. Cl. 52—741 **3 Claims**



1. A method for the fabrication of an insulated structure, the structure having an external convex curved surface to which thermal insulation is to be applied, the steps of the method consisting essentially of affixing to the convex curved surface to be insulated a plurality of sheet metal bands, at least some of the bands extending in generally parallel relationship, disposing malleable sheet metal blanks beneath the bands bending the blanks to form legs extending away from the surface, disposing a plurality of insulating panels on the curved surface to be insulated and retaining the insulating members thereon by means of bending said legs over adjacent insulating members.

4,004,395

METHOD AND MACHINE FOR THE PRODUCTION OF HINGED-LID PACKS FOR GROUPS OF CIGARETTES OR THE LIKE

Dietrich Bardenhagen, Hamburg, and Bernhard Schubert, Neubornsen, both of Germany, assignors to Hauni-Werke Korber & Co., KG, Hamburg, Germany

Division of Ser. No. 331,028, Feb. 9, 1973, Pat. No. 3,802,325.

This application Mar. 28, 1974, Ser. No. 455,926

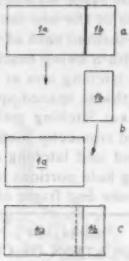
Claims priority, application United Kingdom, Feb. 11, 1972, 06569/72; Feb. 24, 1972, 08674/72

Int. Cl.² B65B *41/16*

U.S. Cl. 53—3 **13 Claims**

1. A method of producing and manipulating blanks which are to be converted into inner envelopes of packs for cigarettes of other smokers' products, comprising the steps of withdrawing a single web of flexible wrapping material from a

source and moving the web lengthwise in a predetermined direction; subdividing the web into composite rectangular blanks each of which consists of two discrete sections, including severing the web lengthwise to form only two discrete elongated strips and thereupon severing said discrete strips crosswise so that each strip yields a succession of discrete rectangular sections, each of said composite blanks consisting of a discrete section of one of said strips and a discrete section of the other of said strips and the area of each blank exceeding the area of either of said discrete sections thereof, the sections of each blank being movable in their entirety with respect to each other; moving one discrete section of each composite



blank toward the other discrete section so that one section of each composite blank only partially overlaps the other section and said area of each blank is only slightly less than the combined area of the respective discrete sections; holding the web and said sections against flexing in a direction transverse to said web and to the direction of movement of said one section of each composite blank so that the length of each blank, as considered in the direction of movement of said one section, equals the combined maximum length of the respective sections minus the extent of overlap of such sections; and converting said composite blanks into inner envelopes to contain smokers' products.

4,004,396

METHOD FOR PACKING COILS OF WIRE NETTING

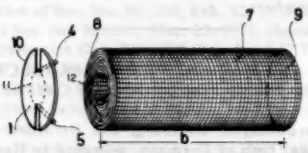
Marc Nijs, Harelbeke, Belgium, assignor to N.V. Bekaert S.A., Zwevegem, Belgium

Division of Ser. No. 482,900, June 25, 1974, Pat. No. 3,929,226. This application June 24, 1975, Ser. No. 589,921

Claims priority, application United Kingdom, July 3, 1973, 31631/73

Int. Cl.² B65B *53/02*

U.S. Cl. 53—14 **6 Claims**



1. A method of packing a wire netting coil comprising:

laying over each end of said coil a protective end cover having a plurality of tongues hingedly connected thereto, said tongues being introduced into said coil in sufficient independent frictional engagement with said coil to keep said end covers in place, said frictional engagement being accomplished independently of any additional element, and

subsequently tightly enclosing said coil with the thusly affixed end covers into a packing sheet.

4,004,397

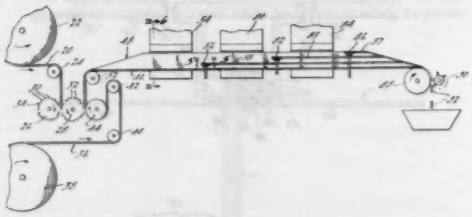
APPARATUS AND PROCESS FOR MAKING DISPOSABLE PACKET ASSEMBLIES

Louis S. Hoffman, Morristown, N.J.; Navinchandra J. Patel, Billerica, and George A. Flibotte, Tewksbury, both of Mass., assignors to Diamond Crystal Salt Company, St. Clair, Mich.

Filed Oct. 24, 1975, Ser. No. 625,524

Int. Cl.² B65B *1/02, 9/04*

U.S. Cl. 53—29 **10 Claims**



1. A process for making a repetitive series of interconnected dispensing packet assemblies which comprises the steps of forming and advancing a longitudinally extending web comprised of opposed strips bonded in face-to-face relationship along transversely extending bands disposed at longitudinally spaced intervals defining a plurality of alternating first and second cavities open along their lateral edges, sealing one lateral edge of the alternating said first cavities, filling the first cavities with a first material, sealing the opposite lateral edge of the filled said first cavities forming a plurality of first packets, sealing one lateral edge of said second cavities, filling said second cavities with a second material, sealing the opposite lateral edge of the filled said second cavities forming a plurality of second packets, and severing said web into sections each comprising an interconnected first and second packet.

4,004,398

EQUIPMENT FOR PACKAGING PULVERIZED MATERIAL

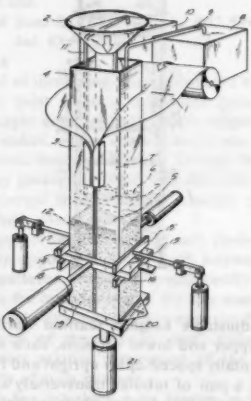
Lars Goran Larsson, and Sture Ingemar Sundberg, both of Malmo, Sweden, assignors to Aktiebolaget Platmanufaktur, Malmo, Sweden

Filed Oct. 17, 1974, Ser. No. 515,661

Claims priority, application Sweden, Nov. 15, 1973, 7315471

Int. Cl.² B65B *31/04, 1/24, 9/12*

U.S. Cl. 53—112 A **13 Claims**



1. Apparatus for producing a container of pulverized material comprising a firm hollow container having an open lower end, said firm hollow container being positioned vertically,

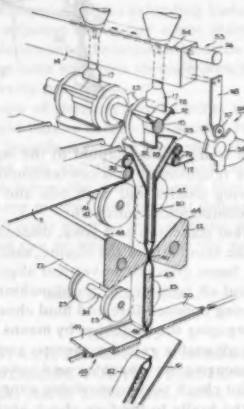
means for feeding a material which will constitute the container of pulverized material, said means feeding said material to said firm container and surrounding said firm container along at least a portion of the length thereof thereby forming a tube of said material surrounding said firm container, said portion comprising said open end, means for closing off said open end of said material constituting the container of pulverized material and supporting said closed end during the feeding of said pulverized material, a piston mounted for reciprocation within said firm container for compressing said pulverized material, said piston comprising a central opening therein, and means for closing off and opening said central opening for the passage of pulverized material therethrough toward said open end, and means for feeding said pulverized material into said firm container toward said open end, whereby the pulverized material fed to the open end of said firm container is compressed by said piston and said material constituting said container of pulverized material is formed into a container by the lowering thereof from said open end.

4,004,399

PACKAGING MACHINE

Denis Borrello, Poughkeepsie, N.Y., assignor to Foodways National, Inc., Hawthorne, N.Y.

Filed Mar. 13, 1975, Ser. No. 558,132
Int. Cl.² B65B 9/12; G01F 11/10
U.S. Cl. 53—180 M **21 Claims**



1. A packaging machine comprising

a hopper for receiving a supply of flowable material, said hopper having a plurality of outlet nozzles in a base thereof for outflow of a plurality of streams of the flowable material;

a rotatable dumper shaft below said hopper, said dumper shaft having a plurality of flow measuring means thereon, each said measuring means being disposed below a respective hopper outlet nozzle and including a pair of discs adjustably mounted on said shaft in coaxial relation for longitudinal movement along said shaft and a plurality of plates between said discs and radially of said shaft to define a plurality of material receiving chambers circumferentially disposed about said shaft, each said chamber being of adjustable size to receive varying amounts of material from a respective outlet nozzle;

a plurality of guide tubes, each said tube being aligned with a respective measuring means to guide a measured amount of material therethrough;

means for moving a pair of continuous sheets over said guide tubes;

means for sealing the continuous sheets to each other between and alongside said guide tubes; and

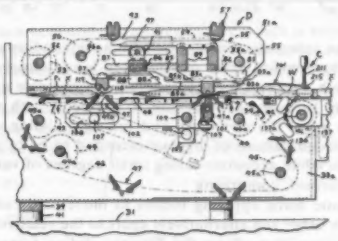
a pair of rotatable seal bars below said guide tubes for sealing the sheets to each other transversely of said guide tubes to define sequentially spaced packets containing measured amounts of the material.

4,004,400

ARTICLE WRAPPING MACHINE

Ralph F. Anderson, and Leo Strombeck, both of Rockford, Ill., assignors to Ralph F. Anderson, Rockford, Ill.

Filed Jan. 2, 1976, Ser. No. 645,949
Int. Cl.² B65B 9/06
U.S. Cl. 53—182 R **33 Claims**



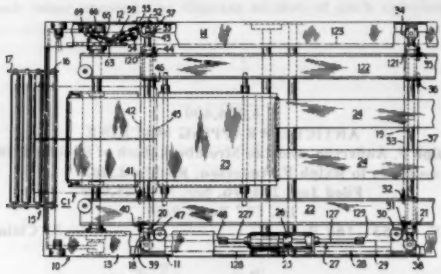
1. In a machine for wrapping articles in an elongated strip of wrapping material and for sealing and severing the strip between adjacent articles to form separate packages, the machine including means for depositing articles on the strip at a loading station, means for folding the strip into a tube around the articles and for sealing the edges of the enfolded tube together as the strip is advanced lengthwise along a generally horizontal path past a longitudinal sealing station, endless type upper and lower jaw conveyor means having adjacent runs thereof extending lengthwise of said path, and upper and lower jaw assemblies on the respective upper and lower jaw conveyor means extending transverse thereto and spaced apart therealong a preselected distance to move in opposed pairs as the upper and lower jaw assemblies move along said adjacent runs thereof, the improvement comprising: said upper and lower jaw assemblies being spaced apart along the respective upper and lower conveyor means a pitch distance at least as long as the length of the maximum size package to be formed, main drive means operable to drive said lower and upper jaw conveyor means through a drive cycle to advance the respective upper and lower jaw assemblies at the same linear speed along the adjacent runs thereof through a distance equal to said pitch distance, adjustably presettable jaw operating means operative to press the opposed pairs of upper and lower jaw assemblies into clamping engagement with the tube during a preset portion of the drive cycle as they advance along the adjacent runs of the upper and lower jaw conveyor means a preset distance substantially less than said pitch distance to clamp the tube therebetween and advance the tube therewith a distance corresponding to said preset distance and to thereafter release the opposed pair of upper and lower jaw assemblies from clamping engagement with the tube to interrupt advance of the tube, and means for severing and sealing the tube at opposite sides of the line of severance while the tube is clamped between an opposed pair of the upper and lower jaw assemblies.

4,004,401

AUTOMATIC CARTON CLOSING MACHINE SIDE GUIDE RAILS HOLDING MECHANISM PROVIDING CLEARANCE FOR ALL CARTONS OF ONE ALLEGED SIZE WITH ACCOMMODATION OF SMALL DEGREES OF VARIANCES

Winton Loveland, Fort Salonga, N.Y., assignor to The Loveshaw Corporation, Deer Park, N.Y.

Filed Mar. 29, 1976, Ser. No. 671,286
Int. Cl.² B65B 7/20
U.S. Cl. 53—374 10 Claims



3. In an automatic carton closing machine, adjustable holding mechanism for a pair of elongated longitudinal clamping rails which converts them to laterally spaced side guide rails extending through the machine to define a path of carton forward travel therebetween and provides sliding clearance for all loaded cartons of a group intended to be of about the same size while accommodating small degrees of variances in widths thereof, comprising

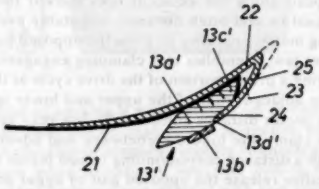
1. elastic force applying means to move said rails toward each other and alternatively apart to the relatively spaced positions that allows the forward sliding transport with ease therebetween past the machine's flaps manipulating and anchoring mechanisms of the loaded cartons of the group which are of standard width, and
2. means further spacing apart said guide rails a relatively small additive tolerance distance which also allows the forward sliding transport with ease therebetween of the loaded cartons of this group which are of widths greater than the standard width.

4,004,402

SADDLE TREE FOR RIDING SADDLES

Lorenz Bischeltsrieder, Furstenfeldbruck, Germany, assignor to Stubben GmbH, Riding Equipment, Langmattring, Switzerland

Filed Mar. 4, 1975, Ser. No. 555,194
Claims priority, application Germany, Oct. 23, 1974, 2450427; Mar. 6, 1974, 2410669
Int. Cl.² B68C 1/00
U.S. Cl. 54—44 6 Claims



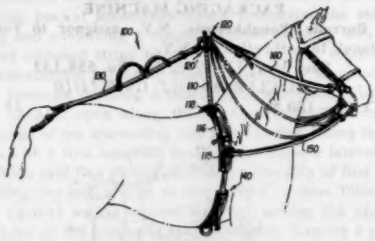
1. A saddle tree which comprises a front saddle tree member having a neck with points depending therefrom, a waist extending rearwardly from said neck, and mounting means adapted to receive cantles of different lengths and widths so that saddle trees of different sizes can be made using identical front saddle tree members, said mounting means comprising a recess in the upper surface of said front saddle tree member providing laterally extending, forward and rearward means for locating a cantle relative to said front saddle tree member; a separate cantle member seated in said recess, said cantle abutting the forward locating means and a lower surface portion thereof being configured to match said recess, thereby positioning said cantle relative to said front saddle member; and means fixing said cantle member to said front saddle tree member.

4,004,403

EQUINE TRAINING AID BALANCER

Woodrow Henry, II, Bobbin Hollow Farm & Tack Shop Bay Road, Amherst, Mass. 01002

Filed May 16, 1975, Ser. No. 578,100
Int. Cl.² B68B 1/00
U.S. Cl. 54—71 1 Claim



1. An equine training aid adapted to the equine body and having coactive relationship to a conventional double bridle, said bridle having snaffle and curb bits and reins therefor, comprising in combination therewith:

A. a check rein stanchion and yoke, disposable rearwardly adjacent the shoulders of the equine, said stanchion having plural bores disposed in vertical alignment on opposite fore and aft positions of the stanchion and said stanchion bearing opposed fore and hind check anchors, said anchors engaging the stanchion by means of set screws in vertically adjustable relation thereto and means for removably securing the stanchion and yoke to said equine;

B. a snaffle bit check rein controllably connecting the snaffle bit of the bridle to the fore check anchor of the stanchion;

C. at least two yoke rings at least one thereof upon the yoke on either side of the equine, to join the curb bit check reins from an anchor end thereof to the curb bit;

D. a flexible crupper extension for connection of the stanchion to the equine quarters; the hind check anchor and locking pin thereof retains the crupper extension to stabilize the stanchion.

4,004,404

ROTARY COMBINE WITH IMPROVED CONCAVE

Edward W. Rowland-Hill, Lancaster, and Louis R. Thomas, Jr., New Holland, both of Pa., assignors to Sperry Rand Corporation, New Holland, Pa.

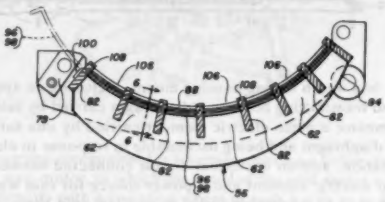
Filed Mar. 1, 1976, Ser. No. 662,764
Int. Cl.² A01D 45/02
U.S. Cl. 56—14.6 13 Claims

1. An axial flow type rotary combine comprising in combination:

a. a mobile frame adapted to be moved along a crop field to be harvested,

b. a header supported by the forward end of said frame and operable to cut crop material,

c. an elevator rearward of said header to receive cut crop material from said header and move it rearwardly to
d. a threshing compartment having a forward end and extending longitudinally rearwardly within said frame,
e. said threshing compartment comprising a powered rotor having rasp bars extending generally longitudinally for coaction with a concave complementary to said rotor in shape and extending generally along the lower peripheral path of the rasp bars to thresh crop material therebetween, and
f. a grain pan at a level beneath said threshing compartment to receive threshed crop material therefrom;
the improvement comprising an improved concave in which;
g. a plurality of longitudinally extending bars extend between curved end plates in transversely spaced relationship to each other,



h. a first row of curved wires extending transversely through said bars adjacent the upper edges thereof and spaced apart predetermined distances to provide a mesh pattern of openings with said bars through which threshed crop material freely passes,
i. a second row of similarly curved wires supported within holes in said bars, whereby the second row of wires are spaced to provide a greater frequency of said wires than in said first row and thereby pockets are provided between and below the wires of said first row to entrap threshed crop material and prevent damage to said material by said rotor prior to said material passing between said second row of wires and onto the grain pan of said combine.

4,004,405

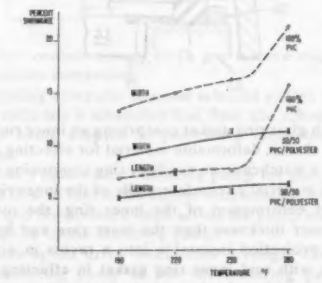
FLAME RESISTANT, THERMALLY STABLE POLYVINYL CHLORIDE-POLYESTER BLENDS

Walter Darchuk, North Little Rock, Ark., assignor to Dan River, Incorporated, Danville, Va.

Continuation-in-part of Ser. No. 232,736, March 8, 1972, abandoned. This application Mar. 4, 1974, Ser. No. 448,084

Int. Cl.² D02G *3/04*

U.S. Cl. 57—140 BY **7 Claims**



1. A fabric for garment use formed solely from a blended yarn consisting of not less than 50% and not more than 80% by weight of syndiotactic polyvinyl chloride textile fibers and 20 to 50% by weight polyethylene glycol terephthalate fibers spun together to provide a yarn having a thermal stability of 265° F. or more, superior spinning and finishing qualities, shrink back and flame resistance.

4,004,406

SPUN TYPE YARN AND PROCESS FOR MANUFACTURING THE SAME

Hirotsugu Suzuki; Yo Ogawa; Yoshikazu Kikuchi, and Shinichi Kitazawa, all of Otsu, Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed Apr. 16, 1975, Ser. No. 568,654

Claims priority, application Japan, Apr. 22, 1974, 49-44497; Feb. 3, 1975, 50-13358

Int. Cl.² D02G *3/02, 3/26*

U.S. Cl. 57—140 R **16 Claims**

1. A yarn consisting of a fiber bundle which is substantially free from true twists and composed of continuous and discontinuous filaments being complexly intertwined with one another and comprising random bends and loops along their lengths, said yarn having a value of a parameter S of not less than 0.5 and a value of a parameter R of not more than 0.1, said parameters S and R being defined as follows:

$$S = B/A$$

$$R = C/D$$

wherein A is the number of fibers contained in a test piece cut at a length of 10 mm along the yarn length under a load of 500 mg/denier and having lengths in the range of not less than 10 mm but less than 12 mm, B is the number of fibers contained in the test piece and having lengths in the range of not less than 12 mm but less than 30 mm, C is the number of fibers contained in the test piece and having lengths not less than 30 mm and D is the number of whole fibers contained in the test piece.

4,004,407

DIGITAL DISPLAY ELECTRONIC TIMEPIECE

Kinji Fujita, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Filed Sept. 19, 1974, Ser. No. 507,511

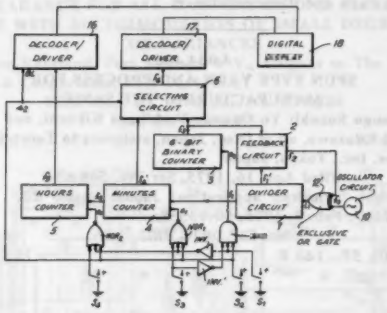
Claims priority, application Japan, Sept. 19, 1973, 48-105597

Int. Cl.² G04C *3/00;* **G04B** *19/30, 27/00*

U.S. Cl. 58—23 R **9 Claims**

1. An electronic timepiece comprising oscillator means for producing a high frequency time standard signal, divider circuit means including a plurality of series-connected divider stages adapted to produce a low frequency time standard signal in response to said high frequency signal, certain of said divider stages producing time keeping signals representative of actual time in response to said low frequency time standard signal, and division ratio adjustment means coupled to said divider circuit and adapted to effect an adjustment of the frequency of the low frequency signal in response to the high frequency signal, said division ratio means producing a setting signal corresponding to the amount of adjustment, digital display means for displaying one of actual time in response to said timekeeping signals being applied thereto and the amount of division ratio adjustment in response to the division ratio adjustment setting signal being applied thereto, and selector means operable between a timekeeping mode and an adjust-

ment mode, said selector means being adapted to receive said timekeeping signals and apply same to said digital display



means in said timekeeping mode and to receive said adjustment setting signal and apply same to said display means in said adjustment mode.

4,004,408

MECHANICAL IMPROVEMENT ON AN ELECTRIC ALARM CLOCK

Roland Siefert, Bad Durrheim; Hans Seckinger, and Herbert Krösche, both of Schwenningen, all of Germany, assignors to Kienzle Uhrenfabriken GmbH, Schwenningen, Germany

Filed Mar. 29, 1974, Ser. No. 456,250

Claims priority, application Germany, Apr. 3, 1973, 7312472[U]; Apr. 6, 1973, 7313007[U]

Int. Cl.² G04C *13/06, 21/00;* **G04B** *37/12;* **H01H** *7/08*

U.S. Cl. 58—38 R **6 Claims**

1. An alarm clock which produces an electric alarm signal and which operates in conjunction with an electric auxiliary device comprising:

first circuit means having first switch means for producing and cancelling said signal, said first switch means including a first switch member;

second circuit means having second switch means of energizing and de-energizing the auxiliary device;

a single electrical contact spring forming an integral part of said two circuit means; and

a circuit board having a circuit member thereon; said contact spring having

a central part thereof permanently fixed to said circuit board;

a first end arranged for movement into and out of circuit making contact with said first switch member; and

a second end arranged for movement into and out of circuit making contact with said circuit member.

4,004,409

WATCH HAVING A PIEZO ELECTRIC BUZZER MECHANISM

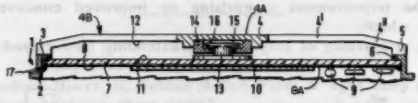
Wolfgang Ganter, Schramberg, and Albert Ginter, Lauterbach, both of Germany, assignors to Gebruder Junghans GmbH, Germany

Filed Jan. 29, 1976, Ser. No. 653,622

Claims priority, application Germany, Jan. 30, 1975, 7502680[U]

Int. Cl.² G04C *21/34;* **H01L** *27/20;* **G08B** *3/02*

U.S. Cl. 58—38 R **7 Claims**



1. In a watch having housing means, including an apertured sound transmitting portion; a diaphragm carried by said housing means; a piezo electric element carried by one surface of said diaphragm and being oscillatable in response to electrical excitation, and an excitation circuit connected between said piezo electric element and a power source for said watch for producing an excitation signal to oscillate said piezo electric element, the improvement wherein:

said diaphragm comprises an electrically insulative material, and

said excitation circuit being carried by said one surface of said diaphragm.

4,004,410

FLUID-TIGHT WATCHCASE AND IMPROVED RING GASKET FOR THE SAME

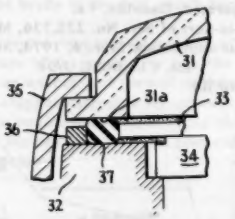
Toshiaki Kawamata, Matsudo, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed Dec. 14, 1973, Ser. No. 424,856

Claims priority, application Japan, Dec. 16, 1972, 47-144521

Int. Cl.² G04B *37/08*

U.S. Cl. 58—90 R **5 Claims**

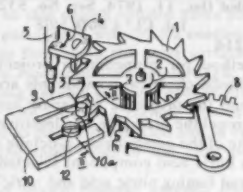


1. A watch glass ring gasket comprising an inner ring gasket made of an elastic, deformable material for effecting a watertight seal in a watchcase, an auxiliary ring comprising an outer ring of rigid material circumferentially of the inner ring limiting outward deformation of the inner ring, the outer ring having a lesser thickness than the inner ring and having an upstanding projection insertable into a recess in a member cooperative with said inner ring gasket in effecting a fluid-tight seal therewith and releasably locking said ring gasket in position relative to a surface sealed by the inner ring, the inner ring having oppositely disposed sealing surface portions defining the thickness dimension thereof.

4,004,411
COUNTING MECHANISM FOR TIMEPIECE

Ali Schneiter, Neuchatel, Switzerland, assignor to Ebauches S.A., Neuchatel, Switzerland

Filed Mar. 25, 1976, Ser. No. 670,630
Claims priority, application Switzerland, Apr. 1, 1975, 4069/75
Int. Cl.² G04B *15/00*
U.S. Cl. 58—116 M **1 Claim**

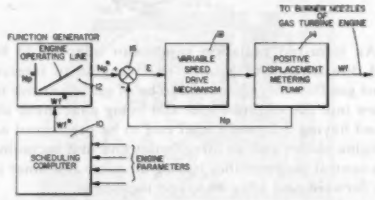


1. Counting mechanism for timepiece having a bidirectional step by step motor, in which the rotor of the said motor cooperates directly with a counting wheel in such a way as to drive it only in one direction, this counting wheel being submitted to the action of a magnet which determines, at each step, its position while cooperating successively with each tooth of its toothing, characterized by the fact that the said magnet is carried by a resilient blade submitted to the action of an adjusting screw against which it is elastically bearing, the rotation of this screw, in one direction or in the other, permitting to move the said magnet in one direction or in the other one and to bring it closer to or farther from the plane of the counting wheel with which it cooperates, so as to permit to vary the force it exerts on the said wheel.

4,004,412
GAS TURBINE ENGINE FUEL METERING SYSTEM

Dennis G. A. Burnell, Winsted, Conn., assignor to Chandler Evans Inc., West Hartford, Conn.

Filed Dec. 20, 1974, Ser. No. 534,663
Int. Cl.² F02C *9/06*
U.S. Cl. 60—39.28 R **1 Claim**



1. A fuel control system for a gas turbine engine having burner nozzles comprising:

a scheduling computer to sense selected engine parameters and calculate a scheduled fuel flow, the scheduling computer being adapted to generate a requested fuel flow signal;

a positive displacement metering pump for pumping a metered flow of fuel to the burner nozzles such that both fuel flow and the pressure head across the pump increase with the speed of the metering pump;

a variable speed drive mechanism drivingly connected to the metering pump to run the metering pump at the commanded speed;

a speed sensing device operatively connected to the metering pump for generating a feedback signal indicative of the actual speed of the metering pump;

means responsive to the scheduled fuel flow to generate a commanded pump speed signal which compensates for the affect on fuel flow of the variation in pressure head with pump speed such that the commanded pump speed signal requests a pump speed which delivers the scheduled fuel flow to the burner nozzles, the scheduled fuel flow responsive means comprising: a function generator for receiving the requested fuel flow signal and generating the commanded pump speed signal in approximate accordance with the following equation:

$$N_p = K W_f^2 + K' W_f - K''$$

wherein:

N_p is pump speed;

W_f is fuel flow;

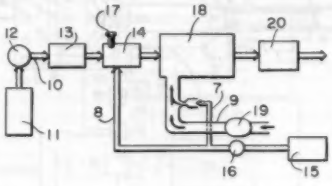
K, K', and K'' are constants; and

means to sum the commanded pump speed signal and the feedback signal for directing an error signal to the variable speed drive mechanism.

4,004,413
COMBUSTIBLE MIXTURE SUPPLY SYSTEM

Zene Ueno, Fuchu, and Tadahiko Nagaoka, Tokorozawa, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Nov. 27, 1973, Ser. No. 419,193
Claims priority, application Japan, Nov. 28, 1972, 47-119198; Dec. 15, 1972, 47-144141[U]
Int. Cl.² F02C *3/20*; F02G *1/00*
U.S. Cl. 60—39.46 M **8 Claims**



1. A combustion engine system having a main combustion chamber, comprising a combuster connected through a first passageway to said combustion chamber, a reaction chamber communicated with said combuster through a second passageway, a source of an oxidizing agent connected through a third passageway to said reaction chamber, a main passageway opening at one end thereof into said main combustion chamber and communicated at the other end thereof with the atmosphere, a fuel source, a first fuel passageway communicated with said main passageway at one end thereof, a second fuel passageway communicated with said combuster at one end thereof, and a third fuel passageway having one end connected with the other ends of said first and second fuel passageways and the other end thereof connected with said fuel source.

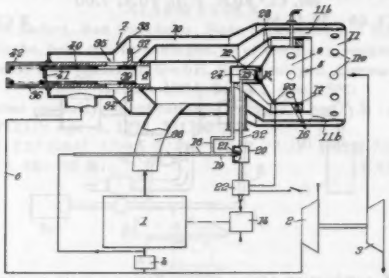
4,004,414
COMBUSTION CHAMBER FOR SUPERCHARGED INTERNAL COMBUSTION ENGINE

Jean Melchior, and Thierry Andre, both of Paris, France, assignors to The Franch State, Paris, France

Filed Nov. 25, 1974, Ser. No. 526,821
Claims priority, application France, Dec. 4, 1973, 73.43112
Int. Cl.² F02C *1/00*; F02G *1/00, 3/00*
U.S. Cl. 60—39.65 **23 Claims**

1. In a supercharged internal combustion engine of the expansible chamber type comprising a turbocompressor with at least one compressor and at least one turbine for driving said compressor, said engine having a combustion chamber system connected between said compressor and said turbine,

a bypass pipe communicating with the outlet of said compressor and with the turbine inlet such that said bypass pipe is in parallel air flow relation with said engine combustion chamber system, said bypass pipe being adapted and dimensioned for direct passage to the turbine of that part of the air flow delivered by the compressor which is not drawn into said engine combustion chamber, an auxiliary combustion chamber operable for reheating gases upstream of said turbine, said auxiliary combustion chamber being supplied with liquid fuel and at the same time be exhaust gases emerging from said engine combustion chamber system and by fresh air taken through said bypass pipe, said auxiliary combustion chamber comprising a tubular element having a closed end and an open end, a primary air intake conduit communicating with said bypass pipe and having an outlet arranged to introduce fresh air into the tubular element in a combustion zone in the vicinity of its closed end, an exhaust gas intake conduit communicating with the exhaust outlet of said engine combustion chamber system and having an outlet arranged to introduce the exhaust gases into the tubular element in the neighborhood of its open end at a mixing zone located downstream of said combustion zone wherein the primary air, or the products of combustion thereof with the fuel, first meet the exhaust gases, said exhaust gas conduit outlet being oriented to effect said introduction with minimum load loss and in the direction of the open end of said tubular element, and a secondary air intake conduit communicating with said bypass pipe and having an outlet arranged to introduce fresh air into the tubular element down-



stream of the upstream end of said mixing zone, said secondary air conduit outlet being arranged to introduce fresh air oriented in a direction transverse to the flow of the exhaust gases in said mixing zone such that the flow of secondary air into said mixing zone is opposed by the flow of the exhaust gases in said mixing zone, the combination therewith of an improved fuel injection and spraying means comprising:

liquid fuel injection port means of constant fixed orifice size and located toward the closed end of said tubular element and oriented for discharging fuel into said combustion zone solely from a given entry zone,

means for delivering pressurized liquid fuel to said port means at a rate and pressure adjustable from a minimum value to a maximum value to thereby vary the quantity of fuel discharged into said chamber via said port means,

said fixed orifice size of said port means being selected small enough for spray atomization of the fuel to the mechanically achieved at said maximum rate solely by hydraulic atomization resulting from discharge of liquid fuel under pressure via said port means into said combustion zone and large enough so that the fuel is not so mechanically atomized at said minimum rate,

air passage means opening into said tubular element at a location close to said port means and oriented to direct an impinging jet air flow against the fuel spray discharged from said port means as the same enters said combustion zone,

and means for permanently delivering spraying air to said air passage means at a speed and at a rate sufficient for the air jet flow from the air passage means to pneumatically atomize the fuel efficiently for the minimum flow rate during operation of said auxiliary combustion chamber.

4,004,415

PROPELLANT FOR LIQUID PROPELLANT GUN

Stanley E. Wood, Inyokern, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 11, 1974, Ser. No. 532,534
Int. Cl.² C06D *5/08*
U.S. Cl. 60—214 **3 Claims**

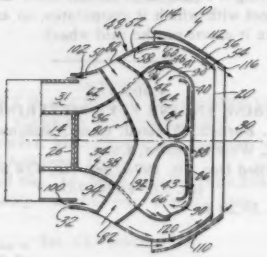
1. In a method for propelling a projectile from a gun wherein two liquid chemical components are injected into a chamber behind the projectile and spark ignited to produce gases which propel the projectile, the improvement residing in utilizing, as one of the components, n-octane and, as the other component, a nitric acid component selected from the group consisting of red fuming nitric acid and nitric acid-water solutions containing from 98 to 82 weight percent nitric acid and 2 to 18 weight percent water.

4,004,416

INFRA-RED SUPPRESSOR FOR USE WITH TURBO-SHAFT ENGINE

Armand F. Amelio, Yonkers, N.Y., and Kenneth M. Rosen, Guilford, Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Mar. 16, 1970, Ser. No. 19,576
Int. Cl.² F02K *3/04*
U.S. Cl. 60—264 **12 Claims**



1. An infra-red radiation suppressor adapted to be positioned downstream of a turbo-shaft engine to intercept the exhaust gas flow therefrom and to be of sufficient size to block off view into the engine outlet and being concentric about an axis and having a forward inlet end to be positioned adjacent the engine outlet and an after outlet end and including:

1. a central plug member having an outer and inner surface, a forward and after end, and including:
   a. a forward portion having walls diverging away from said axis,
   b. an after portion having walls converging toward said axis, and
   c. a central portion smoothly connecting said forward portion and said after portion and cooperating therewith to form a plenum chamber therewithin and the central portion defining the maximum diameter station of said plug with a diameter larger than the engine outlet with which the suppressor is intended for use,
   d. a circumferential extending ejector slot at substantially the maximum diameter station of the plug and opening toward the suppressor outlet,
2. an outer casing having an outer and inner surface, a forward and after end, and spaced therefrom to define an annular passageway therebetween and including:
   a. a forward portion having walls diverging away from said axis,

b. an after portion having walls converging toward said axis and terminating at the casing after end to define the outlet of the suppressor therearound, and

c. a central portion smoothly joining said foreward portion and after portion to define the maximum diameter station of the outer casing substantially in radial alignment for the maximum diameter station of the central plug,

3. ejector means located in said annular passageway adjacent said outer casing forward end and shaped to establish communication between atmosphere and the annular passageway so that engine exhaust gases passing through the annular passageway will cause a cooling film of atmospheric air to flow along the inner surface of the outer casing due to ejector action therethrough, and

4. means defining a sealed passage between atmosphere and said ejector slot so that a cooling film of atmospheric air is caused to pass through said slot in ejector fashion and along the outer wall of the after portion of the central plug,

wherein said sealed passage extends from said outer casing, across said annular passageway, and into said plenum chamber and then along said axis to the plug after portion inner surface and then outwardly along said plug after portion inner surface to said circumferential ejector slot.

4,004,417

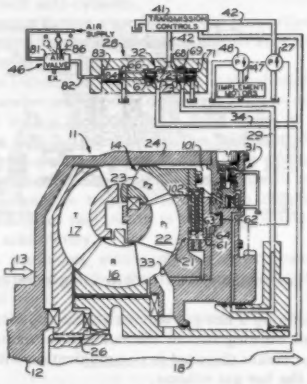
TORQUE CONVERTER WITH SPEED RESPONSIVE SLIP CLUTCH

Albert L. Woody, Peoria; Sidney J. Audiffred, and Howard C. Steury, both of Washington, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Division of Ser. No. 304,492, Nov. 7, 1972, Pat. No. 3,831,726, and a continuation of Ser. No. 86,793, Nov. 4, 1970, abandoned. This application May 6, 1974, Ser. No. 467,180

Int. Cl.² F16D *23/00*

U.S. Cl. 60—363 **2 Claims**



1. A torque converter including power input means, two section impeller means, stator means, turbine means and power output means and comprising connecting means arranged for connecting with two normally separately rotatable elements of the torque converter, said connecting means being hydraulically operable for varying power transmission through the converter, a source of fluid under pressure, a regulating valve associated with said source for transmitting fluid therefrom at a maximum pressure and a control valve associated with said regulating valve to receive the output fluid, said control valve having means in communication with said regulating valve and said connecting means, said control valve means being responsive to rotational speed of a member in the torque converter and pressure of the fluid metered to the connecting means to adjust the communication of the output fluid pressure to the connecting means, manual control means being operatively coupled with the regulating valve to selectively vary the maximum pressure of output fluid received by the control valve, wherein the sections of the impeller means of the torque converter comprises two elements which are connected by the connecting means, said connecting means comprising a slipping clutch, wherein the regulating valve comprises servo means for adjusting the preselected pressure of the output fluid, means for communicating a fluid signal from a portion of the converter to the servo means, the servo means being responsive to the fluid signal received from a portion of the converter and to the manual control means.

4,004,418

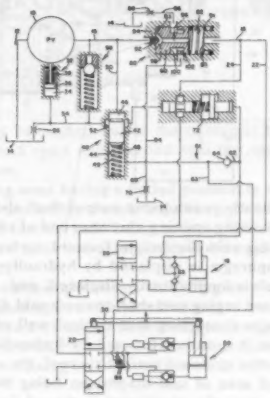
DEMAND COMPENSATED HYDRAULIC SYSTEM WITH FLOW SENSITIVE DEVICE

Harlan Welbert VanGerpen, Cedar Falls, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Dec. 29, 1975, Ser. No. 644,884

Int. Cl.² F16H *39/46*

U.S. Cl. 60—422 **6 Claims**



1. An improved hydraulic system of the type having a variable displacement pump with output control means biased to increase pump output fluid flow and responsive to an input of pressurized fluid to decrease pump output fluid flow, a fluid motor, an output line connected between the pump and the motor, a motor control valve interposed in the output line and having servo feedback from the motor for selectively opening and closing the output line, a control line connected between the pump and the output control means, demand valve means interposed in the control line for selectively opening and closing the control line to allow and block the input of pressurized fluid to the output control means in response to pressurized fluid in a pilot line connected to the demand valve means, said pilot line further connected to the output line between the motor control valve and the motor, wherein the improvement comprises: means operatively associated with the output line, the pilot line, and a fluid reservoir responsive to descreasing flow through the output line to connect the pilot line to the reservoir and responsive to increasing fluid flow in the output line to block the pilot line from the reservoir.

4,004,419

APPARATUS FOR CONVERTING A HYDRAULIC PRESSURE SIGNAL TO A MECHANICAL MOTION

Ralph O. Wallace, 3224 E. 30 Place, Tulsa, Okla. 74114

Filed Feb. 17, 1976, Ser. No. 658,410

Int. Cl.² F16H *39/46*

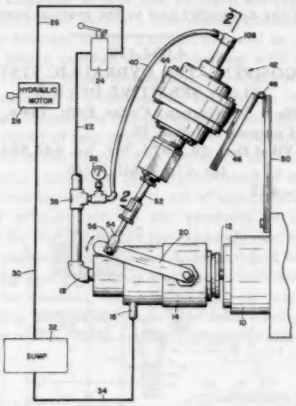
U.S. Cl. 60—445 **12 Claims**

1. An apparatus for converting a hydraulic pressure signal to a mechanical motion, the mechanical displacement being proportional to the value of the hydraulic signal, comprising:

a housing having a cylindrical cavity therein;

a cylindrical diaphragm of impervious flexible material dividing the cavity into a first cylindrical chamber and a second chamber, the second chamber being defined by a truncated conical wall coaxial with the first chamber, the forward surface of the diaphragm forming the base of said conical second chamber, the housing having an opening therein coaxial with said second chamber;

means of imparting hydraulic pressure to said first cavity and thus to the rearward surface of said diaphragm;



a longitudinally positionable output shaft slidably received in said housing opening, the inner end of said output shaft contacting said diaphragm forward surface whereby as said diaphragm is displaced by hydraulic fluid pressure said shaft is longitudinally displaced; and

spring means urging said shaft towards said diaphragm, said diaphragm contacting said conical wall of said forward cavity as it is moved forward by hydraulic pressure applied to the rearward surface thereof, the effective cross-sectional area of said diaphragm being thereby linearly decreased as the diaphragm is moved forwardly by increased hydraulic pressure.

4,004,420

HYDROPNEUMATIC PUMPING ARRANGEMENT

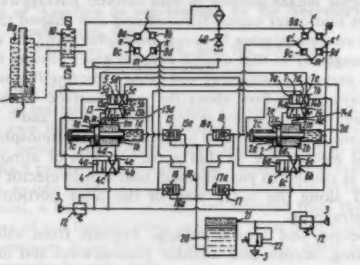
Anatoly Nikolaevich Gavrilov, Kutuzovsky prospekt, 43, kv. 118; Eduard Moiseevich Godin, Begovaya ulitsa, 22, korpus 3, kv. 212, both of Moscow; Leonid Nikolaevich Kebets, Kuibyshevskoi oblasti, ulitsa Sverdlova, 183, kv. 45, Tolyatti; Ivan Zakharovich Beregovoi, Kuibyshevskoi oblasti, Moskovsky prospekt 46, kv. 77, Tolyatti; Vladimir Ivanovich Matskevich, Kuibyshevskoi oblasti, Moskovsky prospekt 66, kv. 45, Tolyatti; Yakov Osherovich Korf, Kuibyshevskoi oblasti, Revoljutsionnaya ulitsa 63, kv. 237, Tolyatti, and Alexandr Grigorievich Dorofeev, Kuibyshevskoi oblasti, ulitsa Stepana Razina 99, kv. 385, Tolyatti, all of U.S.S.R.

Filed Sept. 26, 1975, Ser. No. 617,057

Int. Cl.² F15B *15/18*

U.S. Cl. 60—464 **6 Claims**

1. A hydropneumatic pumping arrangement comprising: at least two double-acting hydropneumatic force multipliers having respective pistons; each having a pneumatic cylinder with two pneumatic chambers and two hydraulic chambers; two pairs of two-position directional valves in the form of cylindrical slide valves with two control chambers, an inlet passage of one directional valve in each pair of valves being in communication with an air source, and outlet passages thereof being in parallel communication with said pneumatic chambers of one force multiplier and with said control chambers of the other directional valve of the same pair of valves; outlet passages thereof being in parallel communication with said control chambers of said one directional valve of the other pair of valves for alternative communication of said pneumatic chambers with said air source in the course of travel of said pistons; interconnected hydraulic non-return valves forming two bridge circuits, one diagonal of each circuit being in communication with said hydraulic chambers of one force



multiplier; hydraulic pressure and return lines communicating with the other diagonal of each circuit, for connection thereto of actuating hydraulic cylinders of the associated processing equipment; and a system for compensating working fluid flowing out of said chambers at said actuating cylinders, inlets of said system being in communication with said one diagonal of each bridge circuit.

4,004,421

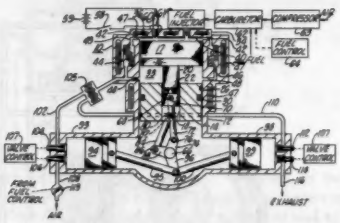
FLUID ENGINE

Kenneth W. Cowans, Los Angeles, Calif., assignor to Ketobi Associates, Tarzana, Calif.

Filed Nov. 26, 1971, Ser. No. 202,169

Int. Cl.² F02G *1/02*

U.S. Cl. 60—516 **15 Claims**



1. A hot gas engine system for providing work energy comprising:

means defining a hot gas volume containing air;

means for burning fuel in the hot gas volume comprising catalyst means disposed in communication with the interior of the hot gas volume;

means disposed adjacent the hot gas volume for providing a high thermal gradient interior boundary thereabout;

means in communication with the hot gas volume for varying the volume thereof in cyclic fashion;

means defining a low temperature gas volume in communication with the hot gas volume;

means coupled to the low temperature gas volume for substituting relatively small increments of air for corresponding increments of the air mixture therein at substantially corresponding temperature and pressure;

adjustable air flow control means coupled to said means for substituting air;

piston means in communication with the low temperature gas volume for varying the volume thereof in timed relation to the variations in the hot gas volume;

thermal regenerator means intercoupling the hot gas volume and the lower temperature chamber to provide gas flow therebetween during changes of volume, said thermal regenerator means having a high area relative to the path length therethrough;

means coupling to said means defining a hot gas volume for releasing thermal energy internally therein; and

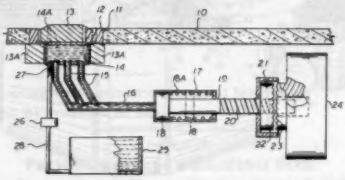
means coupled to the piston means for deriving work energy from the system.

4,004,422

METHOD AND APPARATUS FOR UTILIZING MOVING TRAFFIC FOR GENERATING ELECTRICITY AND TO PRODUCE OTHER USEFUL WORK

Wayne P. Le Van, New York, N.Y., assignor to Van Allyn, Inc., New York, N.Y.

Filed Apr. 14, 1975, Ser. No. 567,650
Int. Cl.² F03G *5/00*
U.S. Cl. 60—533 **8 Claims**



1. An apparatus for producing useful work by utilizing the energy of moving traffic comprising:

a chamber having a flexible wall portion disposed in the path of moving traffic to define a first expansible chamber,

a cylinder,

a conduit interconnecting said chamber into communication with said cylinder,

said conduit having a cross-sectional area which is substantially smaller than the cross-sectional area of said chamber,

a piston slideably disposed within said cylinder,

said chamber and conduit defining a predetermined volume filled with a incompressible fluid which is trapped between said flexible wall portion and said piston of said first and second expansible chambers, whereby the flow of traffic over said flexible wall portion of said chamber pressurizes the trapped fluid therein to effect the displacement of said piston in response to said pressurized fluid accordingly,

a work producing means operatively connected to said piston for translating the displacement of said piston into useful work,

and means for restoring said piston to its initial position after the movement traffic has passed over said chamber.

4,004,423

PACKAGE AND KIT FOR INSTALLATION OF MASTER CYLINDER INTERNAL PARTS

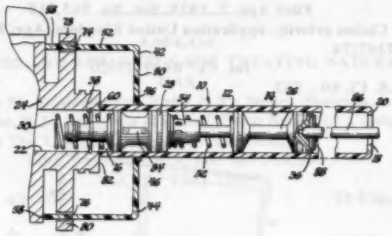
Gerald B. Jacoby, Dayton, and Thomas P. Mathues, Miamisburg, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Apr. 19, 1976, Ser. No. 678,142
Int. Cl.² F15B *7/08*
U.S. Cl. 60—533 **3 Claims**

1. A prepackaged repair kit cooperable with the bore and mounting ears of a master cylinder body, said kit comprising:

a container body for holding and facilitating insertion of a plurality of interrelated and prepositioned parts in the master cylinder body bore and having a container bore with first and second body open ends, said first open end having stop means therein for axially holding the interrelated and prepositioned parts within said container bore relative to said first open end;

a plurality of selectively extendible locating arms having first ends fixed to said container body adjacent to but axially spaced from said second open end, and second ends positioned, when said arms are extended, axially beyond and laterally spaced from said second open end and adapted to mate selectively with bolt holes in the master cylinder body mounting ears to align said container body in an inserting position adjacent the master cylinder body bore whereby the interrelated and prepositioned parts which are prepackaged in said container



bore may be pushed out of the container body through said second open end inserted into the master cylinder body bore;

said locating arms having a folded position in which at least portions thereof lie closely adjacent said container body with said second ends being intermediate the container body open ends and extending toward said body second open end;

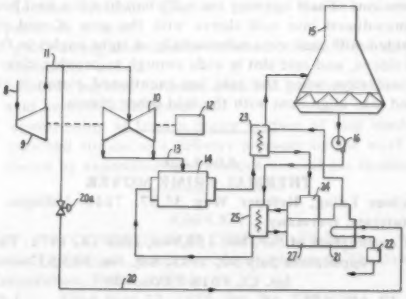
and a removable cap having a rim fitting over said container body second open end and embracing at least part of said locating arms when in their folded position, said cap while fitted over said container body closing said second open end and retaining said locating arms in their folded positions.

4,004,424

METHOD FOR LIMITING BACK PRESSURE ON STEAM TURBINE

Aswath Maddagiri, Concord, Calif., assignor to Bechtel International Corporation, San Francisco, Calif.

Filed May 16, 1975, Ser. No. 578,126
Int. Cl.² F01K *13/02*
U.S. Cl. 60—646 **11 Claims**



1. An improved method for operating a steam turbine wherein a steam turbine exhaust connects to a steam condenser having a coolant circulated through a cooling tower, comprising the steps: removing steam from the steam cycle of

a turbine when the back pressure on the turbine exceeds a predetermined level; extracting heat from the steam and applying the heat to the cooling tower, thereby increasing temperatures in the cooling tower, augmenting thermal fan action, lowering the coolant temperature and limiting the back pressure on the steam turbine; and redirecting the steam back into the steam cycle when the back pressure on the turbine decreases to an acceptable level.

4,004,425

TANDEM MASTER CYLINDERS FOR HYDRAULIC BRAKING SYSTEMS

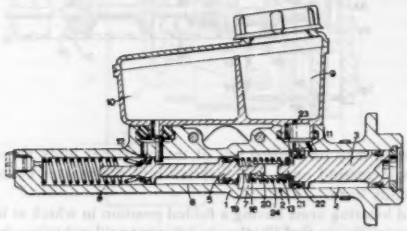
John Flory Pickering, Solihull, England, assignor to Girling Limited, Birmingham, England

Filed Apr. 7, 1975, Ser. No. 565,718

Claims priority, application United Kingdom, Apr. 19, 1974, 17347/74

Int. Cl.² B60T *11/20*

U.S. Cl. 60—562 **7 Claims**



1. A tandem master cylinder for a vehicle hydraulic braking system, the tandem master cylinder comprising a body having a longitudinal cylinder bore, a pedal-operated main piston working in said bore, a secondary piston working in said bore in a position is advance of said main piston, coupling means coupling said pistons for limited relative axial movement in both directions, and a spring acting between said pistons to urge said pistons apart, wherein said coupling means comprise a rigid sleeve having a cylinder wall and first and second oppostie ends, said first end being secured to one of said pistons against movement relative thereto and said second end being provided with an inwardly directed flange, an axial stem extending from the other of said pistons towards the said one piston and fixed relative to the said other piston, and a head carried by said stem and axially slidable in said sleeve, said sleeve being provided in the cylinder wall thereof with an opening of substantially circular outline through which said head is introduced, and a longitudinal slot connecting said opening to said second end of said sleeve, and wherein the dimensions of said opening are sufficient to allow said head to be introduced into said sleeve with the axis of said piston provided with said stem substantially at right angles to that of said sleeve, and said slot is wide enough to provide clearance for said stem when the said last mentioned piston is swung round into alignment with the said other piston.

4,004,426

THERMAL PRIME MOVER

Nikclaus Laing, Hofener Weg 35-37, 7141 Aldingen near Stuttgart, Germany

Continuation of Ser. No. 152,946, June 14, 1971. This application July 30, 1973, Ser. No. 383,537

Int. Cl. F01k *1/00, 3/00*

U.S. Cl. 60—659 **1 Claim**

1. A power plant comprising:

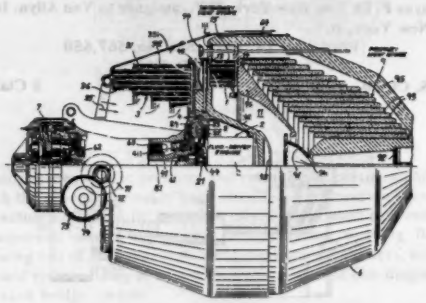
an engine adapted to be driven by the pressure of an expanding vaporizable working fluid;

heat-exchanger means fluidically linked with said engine, said heat-exchanger means including a condenser downstream of said engine and an evaporator upstream of said engine;

first conduit means for conducting said working fluid in a closed circuit through said engine and said heat-exchanger means;

second conduit means for conducting an external heat carrier through said heat-exchanger means in thermally interacting relationship with said working fluid whereby the latter absorbs heat from said carrier upstream of said engine and gives up heat to the environment downstream of said engine;

an external heat source operable to heat said carrier prior to entry thereof into said heat-exchanger means;



heat-storage means outside said closed circuit for heating said carrier prior to entry thereof into said heat-exchanger means in an inoperative state of said external heat source;

switchover means having a first and a second operating position for alternately making said external heat source and said heat-storage means effective to heat said carrier; and

transmission means for operatively coupling said engine to a load;

said condenser and evaporator being a pair of rigidly interconnected radial blowers centered on a common axis of rotation, each of said blowers including a set of tubes extending substantially parallel to said axis.

4,004,427

ENERGY CONVERSION SYSTEM

Tony W. Butler, Jr., 3224 Timmons Lane, No. 136, Houston, Tex. 77027

Filed Aug. 28, 1975, Ser. No. 608,678

Int. Cl.² F03G *7/02*

U.S. Cl. 60—698 **33 Claims**

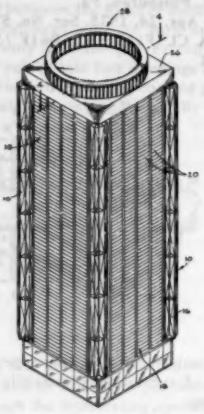
1. An energy conversion system associated with an edifice having a generally vertical outwardly facing side surface, said system comprising:

radiation absorbing means defining a plurality of radiation receiving surfaces adjacent to said side surface but spaced from at least a major portion of said side surface of said edifice to define a flowway between said side surface and said radiation absorbing means and containing a first gaseous medium, each of said radiation receiving surfaces facing generally upwardly and each having a plurality of hollows;

a rotor rotatably mounted on said edifice above said radiation receiving surfaces and comprising a plurality of blades each having a radial component of direction and a tangential component of direction;

ducting apparatus carried by said edifice and disposed to

direct said first gaseous medium from said flowway to said rotor blades to rotate said rotor; and



energy-using first operator means at least a part of which is driven by rotation of said rotor.

4,004,428

PROCESS FOR STABILIZING SOIL

Shunsuke Tazawa, and Kazuo Okabe, both of Yokohama, Japan, assignors to Nitto Chemical Industry Co., Ltd., Tokyo, Japan

Filed Nov. 6, 1975, Ser. No. 629,605
Claims priority, application Japan, Nov. 8, 1974, 49-128090
Int. Cl.² E02D *3/14*
U.S. Cl. 61—36 C **4 Claims**

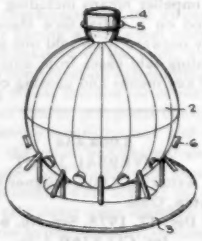
1. In a process for stabilizing soil which comprises injecting into soil a grout mixture consisting of (A) an aqueous sodium silicate solution having a pH of at least 11 wherein the molar ratio of SiO_2/Na_2O is 3.1 to 3.3:1 and (B) an aqueous solution of at least one gelling agent selected from the group consisting of chlorides, sulfates and nitrates of aluminum, magnesium and iron, and then gelling the injected soil mixture in soil, the improvement characterized by adding (C) at least one oxy acid selected from the group consisting of citric acid, tartaric acid and lactic acid to any one of the components (A) and (B) wherein the amount of component (C) used is 0.5 to 20 moles per mole of the gelling agent in (B) and the amount of the gelling agent in (B) is 5 to 50% of the sodium silicate by weight.

4,004,429

DEEP UNDERWATER SPHERE

William J. Mouton, Jr., 2113 Cleary Ave., Metairie, La. 70001

Filed May 1, 1974, Ser. No. 466,045
Int. Cl.² E02D *29/00*
U.S. Cl. 61—86 **6 Claims**



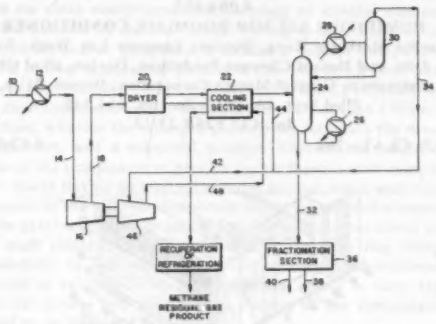
1. A deep underwater sphere comprising: a plurality of spherical sections; each said section having a spherical shaped frame made of a plurality of radially arranged trusses, an outer metal place and an inner metal plate, said inner and outer metal plates are both made of spherical shaped plates; selected said trusses from each of said sections being connected to selected said trusses of an adjacent said section; said plates being arranged on a respective one of said trusses frames such that both said inner and outer plates each extend over said respective frame at one end and such extended portion overlaps said trusses of said adjacent section and are welded to said adjacent section; and a concrete mixture filling the space between said inner and outer plates for serving to impart resistance to compressional forces placed on the sphere and serving as a ballast for securing the proper specific gravity for sinking of the sphere.

4,004,430

PROCESS AND APPARATUS FOR TREATING NATURAL GAS

Stephen M. Solomon, New York, N.Y.; Sidney Shalevitz, Livingston, N.J., and Louis Marshall, Great Neck, N.Y., assignors to The Lummus Company, Bloomfield, N.J.

Filed Sept. 30, 1974, Ser. No. 510,367
Int. Cl.² F25J *3/00*
U.S. Cl. 62—18 **10 Claims**



1. A process for treating a gaseous natural gas stream including carbon dioxide and water vapor to recover ethane, which comprises:

a. heating said gaseous natural gas stream;
b. expanding said gaseous natural gas stream;
c. passing said expanded natural gas stream through a drying section to remove water vapor;
d. introducing into a demethanizer zone said dried and expanded natural gas stream of step (c) to separate a methane-enriched gaseous stream from an ethane-enriched stream;
e. withdrawing said ethane-enriched stream from said demethanizer zone;
f. withdrawing said methane-enriched gaseous stream from said demethanizer zone; and
g. compressing at least a major portion of said methane-enriched stream to a delivery pressure by the work produced by expanding said gaseous natural gas stream.

4,004,431

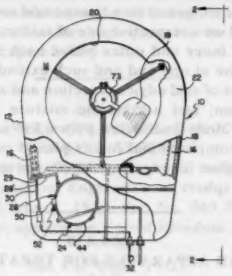
CONTROL FOR COOLING UNIT

Thomas L. Hildreth, Bellevue, Ohio, assignor to The Johnson Corporation, Bellevue, Ohio

Filed May 22, 1975, Ser. No. 579,919
Int. Cl.² F25B *1/00, 31/00, 43/02*
U.S. Cl. 62—228 **17 Claims**

1. In a control for a cooling unit including a compressor for compressing fluid refrigerant, said compressor being disposed in a compressor housing, and a heater means coacting with

said housing for applying heat thereto for attempting to avoid the presence of liquid refrigerant in said housing, temperature sensing means mounted on the exterior of said housing and coacting with said heater means for causing actuation of said



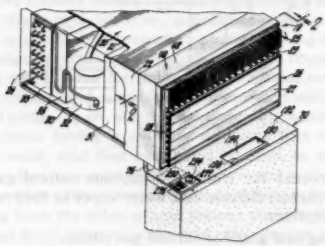
compressor responsive to the rise of temperature of the housing to a predetermined point, said temperature sensing means being operative to cause de-energization of said compressor in the event that the temperature of the housing as sensed by said sensing means falls below said point.

4,004,432

HUMIDIFIER KIT FOR ROOM AIR CONDITIONER

Carlito Maristela Kong, Dayton; Emerson Lee Wark, Vandalia, and Donald Clarence Ferdelman, Dayton, all of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Sept. 18, 1975, Ser. No. 614,745
Int. Cl.² F25B *23/12*
U.S. Cl. 62—262 **4 Claims**



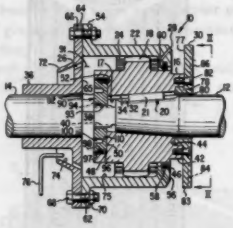
1. A humidifier attachment for use with a room air conditioner provided with a casing having means defining an air inlet and a conditioned air outlet on the room side thereof, fan means for flowing air into said casing through said air inlet and out of said casing through means located across the casing room side having a chamber coextensive with the conditioned air outlet, an elongated evaporation water pad assembly supported in said enclosure chamber, said assembly including an upper water distribution receptacle vertically spaced from a lower drain trough with a water pad being retained therebetween, said receptacle having a base enclosed by side walls and end walls, said base having a slot therein overlying said water pad, said slot bordered by a peripheral dike, said dike and said receptacle walls defining water channel means, conduit means for delivering water from a storage tank into said channel means, said dike being formed with a plurality of modified V-notch weirs each having a radiused notch portion to allow said weirs to achieve a predetermined head in said channel means before discharging water into said slot, whereby water is discharged uniformly from each of the weirs to said water pad, and an electrical control circuit interconnecting humidistat switch means located on said storage tank with said fan means whereby said fan means will cycle with said humidistat switch means.

4,004,433

CONTINUOUSLY LUBRICATED COUPLING

Michael M. Calistrat, Sykesville, Md., assignor to Koppers Company, Inc., Pittsburgh, Pa.

Filed Apr. 24, 1975, Ser. No. 571,394
Int. Cl.² F16D *3/18*; **B61F** *15/22*
U.S. Cl. 64—9 R **2 Claims**



1. A continuously lubricated gear-type coupling for connecting a pair of substantially coaxially aligned rotatable shafts, comprising:

a hub means, having outwardly extending gear teeth, secured to an end of one of said shafts by a key means for rotation therewith;

a sleeve means surrounding said hub means, having inwardly extending gear teeth in meshing engagement with said outwardly extending gear teeth, said sleeve means including an annular metallic sealing ring means between an inturned flange portion of said sleeve means and a shoulder portion of said hub means for preventing the flow of lubricant between said flange portion and said shoulder portion;

a second hub means connecting said sleeve means to the other of said shafts forming a closed chamber within said coupling, said second hub means including an annular lip portion tapering inwardly in a direction away from said sleeve means thus forming an annular trough means on an exterior radial face of said second hub means;

a plurality of inlet port means in said exterior radial face for continuously supplying lubricant from said annular trough means to within said closed chamber;

a plurality of outlet port means in the end of said sleeve means opposite to said second hub means for removal of said lubricant from said closed chamber after said lubricant has lubricated said inwardly and outwardly extending gear teeth;

a sealing means connected to the end of said one shaft within said closed chamber for preventing gases exterior to said coupling from entering said closed chamber from between said hub means and said one shaft, said sealing means being seated within an annular recess formed in an end of said hub means and having an annular resilient sealing ring forming a gas-tight seal between said sealing means and said recess; and

an annular impeller means surrounding said one shaft and secured to an end of said hub means adjacent said sleeve means, said impeller means including radially extending means formed on a radial face thereof for propelling gases radially outward from said one shaft,

thereby preventing said gases from entering said coupling through said key means and causing corrosion thereof.

4,004,434

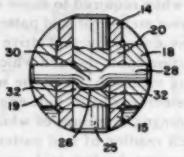
UNIVERSAL JOINT

Joseph M. Raby, Kettering, Ohio, assignor to Gardner-Denver Company, Dayton, Ohio

Filed Dec. 17, 1975, Ser. No. 641,543
Int. Cl.² F16D *3/26*
U.S. Cl. 64—17 R **4 Claims**

1. In a universal joint in which a pair of coupling members

are arranged end-to-end and each having at one end a pair of forks in planes intersecting the planes of the forks of the other member with aligned openings therethrough, and a connecting block mounted between the forks of both pairs with intersecting bores in alignment with the fork openings, the improvement comprising a main pin extending transversely through an aligned pair of said fork openings and through said block bore and having a transversely formed generally central opening therein, said opening being axially offset from the



geometric center of said pin, and a smaller cross pin received in right-angled relation to said main pin through the aligned fork pairs and through the intersecting opening of said block, said cross pin being deformed in a direction along the axis of the main pin in the region of the intersection of said pins to retain said cross pin in assembled position, the maximum extent of the transverse deformation of said cross pin at said main pin opening corresponding to the axial extent of said offset.

4,004,435

DEVICE FOR NON-ROTATABLY SECURING THE OUTER MEMBER OF A JOINT TO A FLANGE OR SHAFT

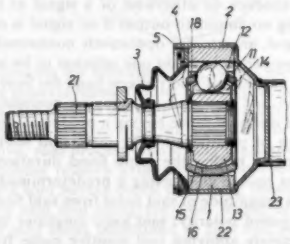
Wolfgang Rubin, Steinheim, Germany, assignor to Lohr & Bromkamp GmbH, Germany

Filed June 23, 1975, Ser. No. 589,582

Claims priority, application Germany, July 22, 1974, 7421287[U]

Int. Cl.² F16D *3/84, 3/30*

U.S. Cl. 64—32 R **6 Claims**



1. In a joint having an outer joint member and inner member drivingly interconnected by a plurality of torque transmitting elements, the combination of the circumference of the outer joint member having a polygonal configuration transverse to the axis of rotation of the joint, a sleeve of corresponding polygonal configuration surrounding said outer joint member and having means thereon for connecting said sleeve to one of a flange of similar polygonal configuration or to a shaft, said sleeve having means on one end thereof and detachable means on the other end thereof engaging opposed end faces of said outer joint member for securing said sleeve against axial displacement with respect to said outer joint member such that said outer joint member is non-rotatably secured by said sleeve to one of a shaft or flange connected to said sleeve, said sleeve being axially displaceable from said outer joint member when said detachable means is detached from the sleeve.

4,004,436

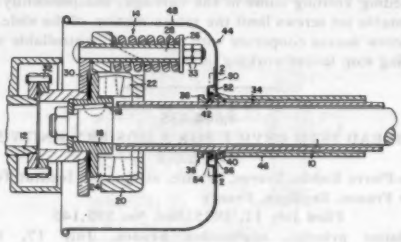
DRIVE LINE SAFETY SHIELD

Roger Eugene Mott, Bettendorf, Iowa, assignor to Deere & Company, Moline, Ill.

Filed July 24, 1975, Ser. No. 598,852

Int. Cl.² F16D *3/84*

U.S. Cl. 64—32 R **7 Claims**



1. In a drive line including a rotating shaft and a rotating drive component coaxially connected to the shaft, an improved safety shield comprising: a rotatable tubular shaft shield coaxially and rotatably mounted around the shaft adjacent the drive component and including an annular element on the exterior of the shaft shield having an external annular groove around its periphery; a rotatable tubular component shield having an enlarged portion at one end and a neck portion at the other and being coaxially and rotatably mounted on the shaft shield and axially shiftable thereon between a normal position, wherein the enlarged portion encompasses the drive component, and a retracted position wherein the shield is clear of the component to provide access thereto, said component shield having an internal annular groove; and a snap ring mounted in the internal component shield groove and seatable in the external groove to axially lock the component shield on the shaft shield in its normal position, the snap ring being expandable in response to the exertion of a predetermined amount of axial force on the component shield to clear the external groove and permit axial shifting of the component shield to its retracted position.

4,004,437

FLAT KNITTING MACHINE

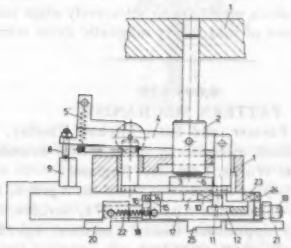
Hans Schieber, Bopfingen; Franz Radl, Westhausen; Erich Krause, Bopfingen, and Reinhold Schimko, Wasseralfingen, all of Germany, assignors to Universal Maschinenfabrik Dr. Rudolf Schieber KG, Westhausen, Germany

Filed Apr. 8, 1976, Ser. No. 675,089

Claims priority, application Germany, Apr. 9, 1975, 2515521

Int. Cl.² D04B *7/00, 15/36, 35/00*

U.S. Cl. 66—78 **8 Claims**



1. A flat knitting machine comprising a needle bed, a carriage traversible along the needle bed, stitch cams which can

be preset in a plurality of different positions according to a desired pattern, at least one ramp in the needle bed fixed to a slide and adapted to displace the cooperating stitch cam into a selected position, means in the carriage for clamping the stitch cam in the position into which it has been displaced by the ramp, wherein the position of said ramp is adjustable by a plurality of independently pre-adjustable set screws, a slide to which the ramp is attached is raisable by control cam means preceding knitting cams in the carriage, independently pre-adjustable set screws limit the return motion of the slide, and set screw means cooperate with separately controllable intercepting stop levers working in slots.

4,004,438

THREAD FEED DEVICE FOR A HOSIERY KNITTING MACHINE

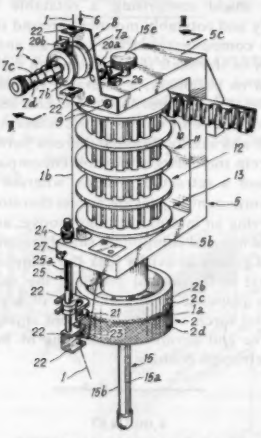
Jean-Pierre Raisin, Troyes, France, assignor to Institut Textile de France, Bouligne, France

Filed July 11, 1975, Ser. No. 595,145

Claims priority, application France, July 17, 1974, 74.24906

Int. Cl.² D04B *15/48*

U.S. Cl. 66—132 R **12 Claims**



1. A thread feed device for a hosiery knitting machine comprising a tensioning mechanism for said thread a cylindrical drum for positive drive of the thread, a shaft coaxial with said drum, an axial groove in said shaft, a projection means on said drum extending radially inwardly of said drum for engagement in said axial groove, a plurality of rotary magnetic drive members surrounding said shaft and a magnetic core on said shaft and fixed for movement therewith and means permitting axial movement of said shaft relative to said drum and said rotary magnetic drive members to selectively align said magnetic core with one of said rotary magnetic drive members.

4,004,439

PATTERN MECHANISM

Ernest Leonard Farmer, and Peter Michael Findlay, both of Leicester, England, assignors to Wildt Mellor Bromley Limited of Adelaide Works, Leicester, England

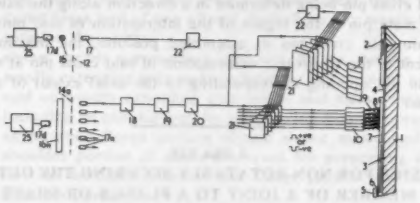
Continuation-in-part of Ser. No. 813,548, April 4, 1969, abandoned. This application Aug. 30, 1971, Ser. No. 176,166

Claims priority, application United Kingdom, Apr. 5, 1968, 16558/68; Dec. 19, 1968, 60457/68

Int. Cl.² D04B *15/78*

U.S. Cl. 66—154 A **3 Claims**

1. A pattern control arrangement for a knitting machine, comprising in combination: needles, cam means for lifting said needles, cam-engaging butts associated with said needles, butts for controlling the location of said cam-engaging butts in or out of cam-engaging position, selectors for engaging said controlling butts, a pattern band, magnetic tape or the like carrying information spots, reading means for moving said selectors into or out of butt-engaging position in accordance with said information spots on said pattern band, tape or the like, said reading means including means for providing pulses for moving said selectors into butt-engaging position when required to move into or remain in that position and also means for providing pulses to move said selectors out of butt-engaging position when required to move out of or remain out of that position, drive means for said pattern band, tape or the like, carrier means driven by said drive means and having secondary information spots thereon which are adapted to be read by the reading means to act as the source of said pulses for moving said selectors out of butt-engaging position, said selectors being arranged in groups of which one selector is to be actuated at each reading of said pattern band, tape or the like said carrier means having said secondary information spots arranged thereon in a number of rows equal to the number of selectors in each group, the reading means includes a logic amplifier for each selector, the said logic amplifier



having a first input from the principal information spots on the pattern band, tape or the like and relating to the pattern, and a second input from the said secondary information spots arranged in a number of rows equal to the number of selectors in a group, the said logic amplifier being such as to give an amplified output following the detection of a second input, the polarity of the amplified outputs being controlled by the detection of the existence or otherwise of a signal at the first input, there being no amplified output if no signal is detected at the second input, an actuator operatively connected to and controlling the movement of said one selector to be actuated at each reading position of said pattern band for moving said one selector into and out of butt-engaging position, a first source of a fixed duration pulse having a predetermined magnitude and being of positive polarity, a second source of a fixed duration pulse having the same fixed duration as the pulse of said first source and having a predetermined magnitude equal to the magnitude of said pulse from said first source but being of negative polarity, said logic amplifier including means for selectively applying said positive pulse from said first source and said negative pulse from said second source to said actuator for moving said one selector into or out of butt-engaging position, respectively, or vice versa.

4,004,440

CABLE LOCK FOR SMALL APPLIANCES

William Emil Dreyer, 13818 Castle Blvd., No. 101, Silver Spring, Md. 20904

Filed Mar. 19, 1976, Ser. No. 668,562

Int. Cl.² E05B *73/00*

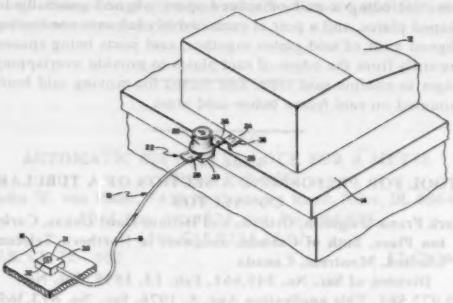
U.S. Cl. 70—15 **11 Claims**

1. A compact device for restricting movement of an article relative to a base, comprising:

an elongated plate member, a first region of said member being secured to the bottom of said article, a second region of said member having a step-shaped portion between an upper horizontal part and a lower horizontal

part adjacent said article, an exposed part of said second region extending parallel to and above a surface supporting said article;

a cable having first and second ends;



lock means attached to the first end of said cable for locking the first end to said upper horizontal part of said plate member; and

anchor means attached to the second end of said cable for securing the second end to the base.

4,004,441

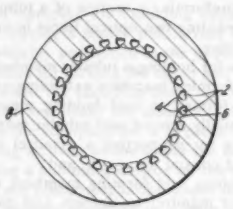
PROCESS FOR MODIFYING CAPILLARY GROOVES

Edward H. Leszak, Amityville, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Aug. 28, 1975, Ser. No. 608,705

Int. Cl.² B21D *53/06*

U.S. Cl. 72—75 **15 Claims**



1. A process for manufacturing tubing having longitudinal capillary grooves formed in the wall thereof in which the lands between said grooves are such that the width of the opening of the grooves is smaller than the width of the cross-section of the groove, said process comprising the steps of:

establishing relative axial rotation between the workpiece and a tool having metal deforming means; and

passing said tool along the axial length of the workpiece, said tool being positioned so that said deforming means contacts said lands between said grooves with sufficient pressure to cause a displacement of portions of the tops of said lands such that said displaced portions serve to reduce the opening of said grooves.

4,004,442

MACHINE FOR LONGITUDINAL MULTIPASS KNURLING OF PROFILES

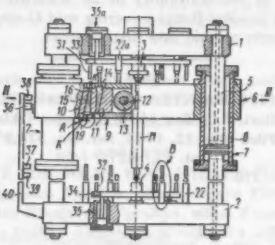
Vladimir Sergeevich Strelchenko, prospekt Lenina, 75, kv. 57, and Valery Ilich Gomlyakov, ulitsa Molodezhnaya, 62, kv. 27, both of Barnaul, U.S.S.R.

Filed Feb. 23, 1976, Ser. No. 660,493

Int. Cl.² B21B *17/00*

U.S. Cl. 72—214 **5 Claims**

1. A machine for longitudinal multipass knurling of profiles, comprising: parallel stationary crossbars; slides rigidly coupling said stationary crossbars one to the other; centers for positioning a workpiece, which are mounted one opposite the other of said stationary crossbars; a movable crossbar mounted between said stationary crossbars on said slides and adapted for reciprocating motion along the axis of said centers; a knurling head mounted on said movable crossbar coaxially with said centers and having a housing wherein there are slots arranged radially with respect to the axis of said centers; sliders received in said radial slots; knurls installed in said sliders and adapted for rotation; a device for moving said sliders with said knurls in said radial slots, comprising self-braking wedges installed in pairs in each radial slot to interact



with said sliders, the same butt ends of said self-braking wedges facing in opposite directions, and stops interacting with said self-braking wedges, said stops being mounted on both said stationary crossbars, each opposite one of said self-braking wedges, the stops which interact with the lesser butt ends of said self-braking wedges being adapted for reciprocating adjustment motion along the axis of said centers and being depressed in the initial position relative to the stops interacting with the larger butt ends of said self-braking wedges.

4,004,443

DYNAMIC SEALING DEVICE FOR HIGH-TEMPERATURE AND HIGH-PRESSURE OPERATION

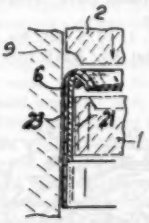
Jean Gavinet, Orsay, and Louis Segurens, Verrieres-le-Buisson, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Continuation of Ser. No. 355,169, April 27, 1973, abandoned, which is a continuation of Ser. No. 170,648, Aug. 10, 1971, abandoned, which is a division of Ser. No. 860,539, Sept. 24, 1969, abandoned. This application Apr. 4, 1974, Ser. No. 458,056

Claims priority, application France, Oct. 16, 1968, 68.170163; July 2, 1969, 69.22376

Int. Cl.² B21C *23/00*

U.S. Cl. 72—253 R **2 Claims**



1. A dynamic sealing system for high-temperature and high-pressure operation in presses for hot extrusion of billets, the presses having an extrusion chamber, a billet in the chamber, a die through which the billet is forced and a ram exerting extrusion force on the billet, the dynamic sealing system being interposed between the ram and the billet in the extrusion chamber comprising first and second supporting members interengaging with clearance along a common axis of the application of a thrust on said members, a metallic O-ring seal imprisoned between said members adjacent the periphery

thereof, a flat bearing surface of small cross-sectional area on said first member applied against said seal and extending at right angles to said axis, an inclined bearing surface on said second member applied against said seal in the direction of the exterior of said second member, said members subjecting said seal within said clearance to permanent creep deformation under pressure toward the exterior of said members under a compressive force which is greater than said thrust in the ratio of the area of said flat bearing surface to the area of application of said members and a thin metallic cylindrical skirt terminating at one extremity in an inwardly directed and substantially annular flange covering said O-ring and extending downwardly around said first member.

4,004,444

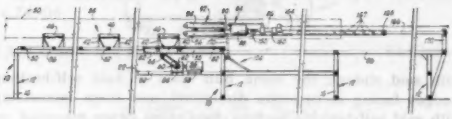
PIPE MAINTENANCE APPARATUS

Gary M. Pollart, P.O. Box 1558, Guymon, Okla. 73942

Filed May 12, 1975, Ser. No. 576,879

Int. Cl.² B21D *1/08*

U.S. Cl. 72—370 **23 Claims**



1. Apparatus for removing anomalies from pipe comprising:
an elongated framework;
a carriage reciprocally mounted on said framework;
means on said carriage for supporting an elongated pipe section over said carriage for reciprocating movement therewith; and
force exerting means positioned for partial entry into the interior of a pipe section through an open end thereof as said pipe section is carried on, and reciprocated by, said carriage, said force exerting means comprising:
a pair of semi-cylindrical shoes each having an outer peripheral surface formed on a radius of curvature less than the radius of curvature of the wall of a pipe section from which the anomaly is to be removed; and
means for non-manually divergently moving said shoes with respect to each other while said shoes are inside said pipe section to cause said shoes to exert a radially outwardly acting force on said pipe section by contact of the semi-cylindrical surface of at least one of said shoes with the internal wall of the pipe section.

4,004,445

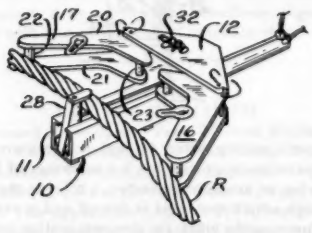
ROPE BENDING DEVICE

Dean W. Larson, Portland, Oreg., assignor to Esco Corporation, Portland, Oreg.

Filed Dec. 1, 1975, Ser. No. 636,413

Int. Cl.² B21F *1/06*

U.S. Cl. 72—389 **5 Claims**



1. A device for bending wire rope comprising a frame, a pair of spaced apart, generally L-shaped arms mounted on said frame for pivotal movement in a common plane, said arms being positioned on said frame in side-by-side, opposed relation to provide a rope-receiving mouth, and a hook movably mounted on said frame for confining and pulling an intermediate portion of said rope between said arms in said plane whereby engagement of said rope with said arms pivots the same to force said rope into an eye configuration, each of said arms including a pair of spaced-apart, aligned generally L-shaped plates, and a post at each end of each arm connecting aligned ends of said plates together, said posts being spaced inwardly from the edges of said plates to provide overlapping edges to confine said rope, and means for moving said hook mounted on said frame below said arms.

4,004,446

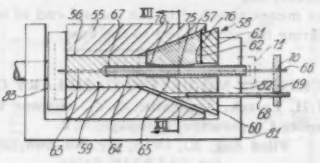
TOOL FOR PREFORMING A SECTION OF A TUBULAR CONNECTOR

Jack Frank Dalgleish, Ottawa, and Helmut Hans Lukas, Carleton Place, both of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Division of Ser. No. 549,661, Feb. 13, 1975, Pat. No. 3,972,585. This application Apr. 5, 1976, Ser. No. 673,365

Int. Cl.² B21D *9/05*

U.S. Cl. 72—400 **2 Claims**



1. A tool for preforming a section of a tubular connecting member for connecting two optical fibres in end to end relationship, comprising:
holding means for holding a tubular member;
a plurality of forming members extending radially in elongated slots formed in said holding means and spaced circumferentially around said tubular member;
support means for supporting a mandrel in said tubular member and coaxial therewith, and
means for pushing said forming members radially inward towards said mandrel to deform said tubular member radially into contact with said mandrel at a plurality of positions, said forming members having a radially inward edge having a central V formation and an inclined face each end of said V formation.

4,004,447

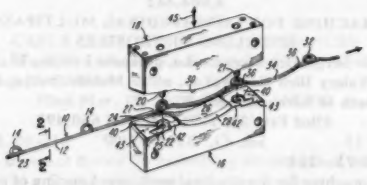
METHOD AND APPARATUS FOR COINING AND CURVING LOOPED WIRE

Joseph W. Wantling, Wellington, Ohio, assignor to Wedge Wire Corporation, Wellington, Ohio

Filed Dec. 10, 1975, Ser. No. 639,475

Int. Cl.² B21C *37/04*

U.S. Cl. 72—414 **5 Claims**



4. The method of simultaneously curving and cross sectionally shaping a wire element with cooperating die elements, one of which includes a first working surface in the shape of a

convex frustum generated about a first axis, the other of which includes a second working surface in the shape of a concave frustum generated about a second axis and inclined to said first working surface, which comprises moving said die elements relatively to compress said wire element between the frusta thereof in a direction which advances said first and second axes toward coincidence.

4,004,448

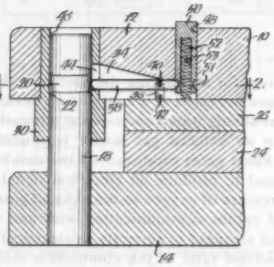
AUTOMATIC DIE SAFETY LOCK FOR A METAL STAMPING DIE

John W. von Holdt, 7430 N. Croname Road, Niles, Ill. 60648

Filed Aug. 14, 1975, Ser. No. 604,806

Int. Cl.² B21J *13/02*

U.S. Cl. 72—462 **12 Claims**



1. In a metal stamping die including upper and lower die assemblies and having a leader pin carried by the lower die assembly and slidably positioned in the upper die assembly, a locking mechanism for locking the upper and lower die assemblies together when the stamping die is out of press, and releasing the upper and lower die assemblies from locking engagement when the stamping die is in press, comprising:

means defining a cavity in the upper die assembly;

means defining a camming surface on the upper portion of the leader pin positioned in the upper die assembly;

a safety pin slidably disposed in a bore in the upper die assembly for sensing whether the die is in press, said safety pin projecting upwardly out of the upper die assembly when the die is out of press;

spring means associated with said safety pin normally urging said safety pin upwardly to the out of press position;

an elongated lockbar pivotally mounted in said cavity, one end of said lockbar being in engagement with said safety pin and the other end of said lockbar being engageable with said camming surface, said lockbar being movable to an in press position, an intermediate position and an out of press position; and

pivot means for pivotally supporting said lockbar in said cavity.

4,004,449

IMPACT SOUND STRESSING FOR SEMICONDUCTORS

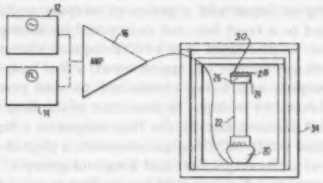
Edward F. Gorey, Beacon, and Guenter H. Schwuttke, Poughkeepsie, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 30, 1975, Ser. No. 591,922

Int. Cl.² G01N *3/32*

U.S. Cl. 73—12 **12 Claims**

12. Apparatus for creating micro-damage in the surface of a semiconductor wafer in a controlled amount comprising, a plurality of spherical shaped objects disposed on said surface for movement relative to said wafer and, means for vibrating



said wafer such that said vibrations cause said objects to bounce on said surface inducing micro-damage in the surface.

4,004,450

DEVICE FOR MEASURING IMPACT PULSES

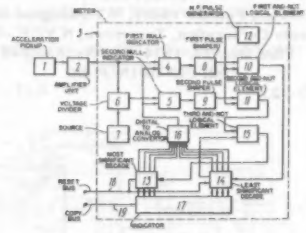
Alexandr Sergeevich Yakshin, ulitsa Malaya Filevskaya, 66, kv. 104; Oleg Nikolaevich Novikov, ulitsa Kuznetsky most, 18/7, kv. 6; Dmitry Alexeevich Grechinsky, ulitsa Tolbukhina, 8, korpus 2, kv. 48; Viktor Alexandrovich Klochko, ulitsa Oktyabrskaya, 38, kv. 374, and Viktor Georgievich Rygalin, 3 Dorozhny proezd, 5, korpus 2, kv. 103, all of Moscow, U.S.S.R.

Filed Dec. 15, 1975, Ser. No. 640,710

Claims priority, application U.S.S.R., Dec. 19, 1974, 2087064

Int. Cl.² G01N *3/30;* **G01M** *7/00*

U.S. Cl. 73—12 **4 Claims**



1. A device for measuring impact pulses comprising:

an acceleration pickup provided with an output and converting the mechanical vibrations of an object into electric signals;

an amplifier unit with an input and output, said input being connected to said output of said acceleration pickup, said amplifier unit receiving said electric signals coming from said acceleration pickup; and

a meter for measuring the parameters of said impact pulse, namely its peak value, having a first input connected to said output of said amplifier unit, said meter receiving electric signals from this amplifier unit and comprising a first null-indicator whose first input serves as said first input of said meter, a voltage divider whose first input serves as a second input of said meter and is also connected to said output of said amplifier unit, a source of reference voltage having an output connected to a second input of said voltage divider, a second null-indicator having its first input connected to an output of said voltage divider, a first pulse shaper having its input connected to an output of the first null-indicator, a second pulse shaper having its input connected to an output of the second null indicator, a first AND-NOT logical element having its first input connected with an output of said first pulse shaper, a second AND-NOT logical element having its first input connected to an output of said second pulse shaper, a H.F. pulse generator having an output connected to a second input of each of said first and second

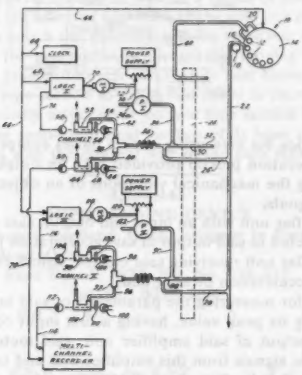
AND-NOT logical elements, a third AND-NOT logical element having its first input connected to an output of the second AND-NOT element, a most significant decade having an input and a group of outputs and being connected to a reset bus and connected by its input with an output of the third AND-NOT logical element, a least significant decade having an input, a first output, a group of outputs and being connected to said reset bus and connected by its input to an output of the first AND-NOT logical element and by the first output to a second input of third AND-NOT logical element, a digital -to- analog convertor having a first and a second group of inputs and an output and connected by its first group of inputs to said group of outputs of said most significant decade, by its second group of inputs to said group of outputs of said least significant decade and by its output to a second input of each of the first and second null-indicators, an indicator, having a first and a second group of inputs and connected to a copy bus, connected by its first and second group of inputs to said groups of outputs of said most significant and least significant decades, respectively, and indicating the measured value of said peak value of said impact pulse.

4,004,451

AUTOMATED TIMING OF FLUID DELIVERY IN SAMPLE ANALYSIS

Donald A. Burns, Putnam Valley, N.Y., assignor to Technicon Instruments Corporation, Tarrytown, N.Y.

Filed Dec. 24, 1974, Ser. No. 536,140
Int. Cl.² G01N *31/00*
U.S. Cl. 73—23 **17 Claims**



1. A method for quantitatively analyzing a constituent of a liquid sample, comprising:

flowing in a first conduit portion toward a second conduit portion a stream including said sample at a constant volumetric rate;

introducing at a volumetric rate continually another fluid into the stream in said first conduit portion:

determining the velocity of said stream in one of said conduit portions and generating a signal in response thereto:

proportionately varying said volumetric rate of said introduction of said other fluid into said first conduit portion in response to said signal to control the dwell time of said sample in said conduit portion: and

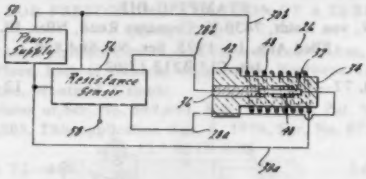
analyzing said sample constituent in said second conduit portion.

4,004,452

AIR/FUEL RATIO SENSOR FOR AIR/FUEL RATIOS IN EXCESS OF STOICHIOMETRY

Eleftherios M. Logothetis, Birmingham; Kamlakar R. Laud, and Kwansuh Park, both of Ann Arbor, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Continuation-in-part of Ser. No. 463,345, April 23, 1974, Pat. No. 3,933,028. This application Oct. 3, 1975, Ser. No. 619,345
The portion of the term of this patent subsequent to Jan. 20, 1993, has been disclaimed.
Int. Cl.² G01N *7/02, 31/00*
U.S. Cl. 73—23 **10 Claims**



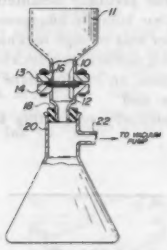
6. In a system for monitoring the air/fuel ratio of the combustion mixture provided to a combustion device intended to operate under steady state conditions at a preselected air/fuel ratio wherein an exhaust gas sensor is situated within the stream of exhaust gases produced by the combustion device and is arranged to produce an electrical signal indicative of the partial pressure of oxygen in the exhaust gases and including electrical means communicating with and responsive to the sensor and arranged to generate an electrical signal indicative of the air/fuel ratio of the combustion mixture, the improvement wherein the exhaust gas sensor is comprised of a cobalt monoxide ceramic sensing element connected electrically in series with a source of electrical energy and the electrical means are arranged to respond to the current flow through said cobalt monoxide sensing element to generate an output signal having a magnitude and polarity indicative of excursion of the air/fuel ratio of the combustion mixture from a selected value in the lean regime.

4,004,453

METHOD FOR DETECTING OIL IN WATER

Per T. Thyrum, 100-D Phelps Ave., New Brunswick, N.J. 08901

Filed Dec. 8, 1975, Ser. No. 638,471
Int. Cl.² G01N *33/18*
U.S. Cl. 73—61.1 R **27 Claims**



1. A method for determining the presence of a first liquid of low solubility and low surface activity particulately dispersed in a second liquid, comprising:

filtering a sample of said liquids through a porous filter element at a controlled flow rate;

pressing a pad impregnated with an oil-soluble, water-insoluble dye against the upstream surface of the element; and

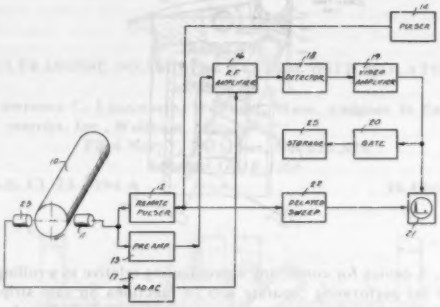
removing said pad and observing the color stain on the surface of said element which was contiguous with said pad.

4,004,454

ULTRASONIC INSPECTION METHOD OF PULSE REFLECTION DEFECT DETECTION USING A THRU-TRANSMISSION AUTOMATIC DISTANCE-AMPLITUDE COMPENSATION

Istvan M. Matay, North Royalton, Ohio, assignor to TRW Inc., Cleveland, Ohio

Filed May 7, 1975, Ser. No. 575,460
Int. Cl.² G01N *29/04*
U.S. Cl. 73—67.8 R **10 Claims**



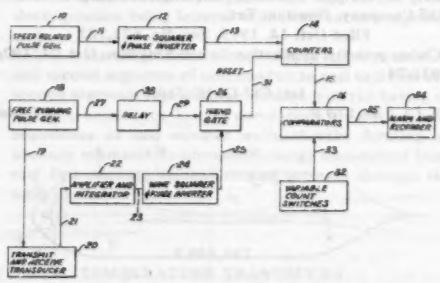
1. A pulse echo inspection device including a receiver having variable gain control means for testing a specimen comprising, first transducer means for periodically transmitting a signal into said specimen from one side thereof, and supplying echoes to said receiver, a second transducer means mounted on the opposite side of said specimen and receiving directly transmitted signals from said first transducer means, and an automatic distance-amplitude correcting device receiving the output of said second transducer means and producing a gain control signal which is supplied to said variable gain control means of said receiver.

4,004,455

FLAW DETECTING APPARATUS FOR RAILROAD RAILS AND THE LIKE

Chester W. McKee, Flossmoor, and C. Glenn Henderson, Ottawa, both of Ill., assignors to Teleweld, Inc., Streator, Ill.

Filed May 23, 1975, Ser. No. 580,158
Int. Cl.² G01N *29/04*
U.S. Cl. 73—67.9 **9 Claims**



1. Apparatus for moving along a railroad rail to test and detect flaws in the railroad rail, comprising:

means for transmitting ultrasonic signals into the rail and for receiving associated echo signals reflected from within the rail;

means operably connected to said transmitting means for producing a trigger signal that causes said transmitting means to transmit an ultrasonic signal, said trigger signal being generated independently of the movement of the apparatus along the rail,

means operably connected to said trigger signal producing means and said transmitting and receiving means for producing an electrical reset signal only in response to an echo signal being received at a predetermined time following the transmitting of an ultrasonic signal, said predetermined time corresponding to the time at which a transmitted ultrasonic signal which has traveled to and reflected from the bottom of the rail will have returned to the transmitting and receiving means, whereby a reset signal is generated only when an echo signal is received from the bottom of a rail;

means for producing electrical pulses at predetermined intervals of distance as said apparatus moves along the rail;

means connected to said pulse producing means and said reset signal producing means for counting said pulses, said counting means being reset in response to a reset signal being received; and

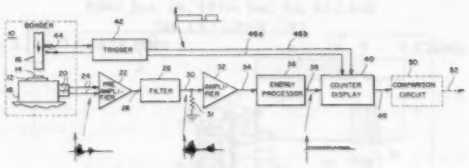
means sensing the state of said counting means for producing an indication of a flaw when said count exceeds a predetermined value.

4,004,456

METHOD AND APPARATUS FOR THE REAL-TIME, NON-DESTRUCTIVE EVALUATION OF ADHESION BONDS USING STRESS-WAVE EMISSION TECHNIQUES

Sotirios John Vahaviolos, East Windsor Township, Mercer County, N.J., assignor to Western Electric Company, Inc., New York, N.Y.

Filed Aug. 18, 1975, Ser. No. 605,489
Int. Cl.² G01N *29/00*
U.S. Cl. 73—71.4 **12 Claims**



1. A method for the real-time, non-destructive evaluation of the strength of an adhesion bond the formation of which includes a compression phase using stress-wave emission techniques, comprising the steps of:

a. measuring the stress-wave energy emitted from the bonding area during the compression phase; and

b. determining the strength of the adhesion bond by comparing the measured stress-wave energy with a predetermined substantially linear relationship between the emitted stress-wave energy and the strength of the particular type of adhesion bond being formed.

4,004,457

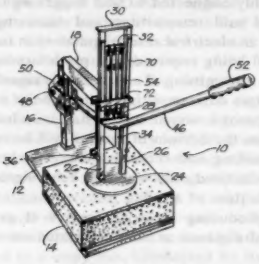
COMPRESSION TESTER

Richard Eide, Minneapolis, and Gerald A. Golembeck, Lake Elmo, both of Minn., assignors to The United States Bedding Company, St. Paul, Minn.

Filed Jan. 13, 1976, Ser. No. 648,768
Int. Cl.² G01N *3/08*
U.S. Cl. 73—94 **6 Claims**

1. In a compression tester for resilient objects comprising a supporting bed for the object to be tested, a platen movably positioned over said supporting bed, a movable frame supporting said platen, a scale for measuring the force applied by said platen to said object, an actuating arm for driving the platen

into said object, said scale having an upper end suspended from said frame and a lower end connected to said actuating arm, driving force applied to said actuating arm being transmitted through said arm to said scale, and through said scale to said frame and platen whereby driving of the platen into



said object provides a reading on said scale for determination of the force applied, and means for measuring the distance of depression of the platen into the object whereby the force required for depression of the platen for a given distance can be measured.

4,004,458

ELECTROMAGNETICALLY COMPENSATED BALANCE OR DYNAMOMETER

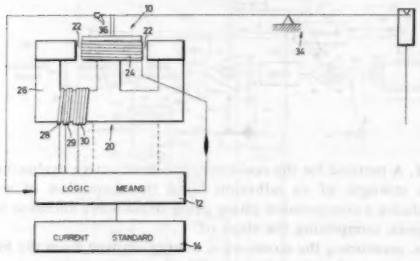
Erich Knothe, Eddigehausen; Franz Josef Melcher, Ellierode, and Christoph Berg, Gottingen, all of Germany, assignors to Sartorius-Werke GmbH (und. vorm. Gottinger Prazision-swaagenfabrik GmbH), Gottingen, Germany

Filed Mar. 5, 1976, Ser. No. 664,416

Claims priority, application Germany, Mar. 13, 1975, 2511103

Int. Cl.² G01L *1/00*

U.S. Cl. 73—141 R **11 Claims**



1. An electromagnetically compensated balance or dynamometer which comprises a coil disposed in the work gap of a magnet, said magnet being an electromagnet having a soft magnet core provided with discrete groups of turns, the number of ampere turns in the groups of turns corresponding to the sequence of code values of a preselected code, either said coil or magnet being movable and being deflected out of a predetermined equilibrium position relative to the unmovable one of the magnet or coil under the influence of a force, a position indicator, logic means including a counter, the input of the counter being connected to the position indicator and the output of the counter being connectable to selected ones of the groups of turns to provide a concordance between the count held in the counter and the number of ampere turns in the selected groups of turns, and a constant current source; the position indicator; in the presence of a deflection, controlling the counter as a function of the direction of deflection, and the logic means connecting the output of the constant current source to the coil and to the particular groups of turns associated with the count held in the counter whereby the deflection is compensated and the movable one of the magnet or coil is returned to its predetermined equilibrium position and the final count held in the counter is proportional to the magnitude of the force.

4,004,459

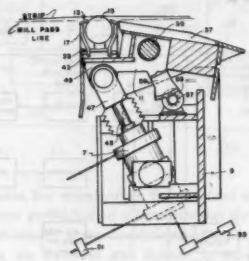
COMBINATION STRIP CONTACTING DEVICE FOR USE IN A ROLLING MILL

Joseph Irwin Greenberger, Pittsburgh, Pa., assignor to Wean United, Inc., Pittsburgh, Pa.

Filed Apr. 14, 1976, Ser. No. 676,942

Int. Cl.² G01L *5/10*

U.S. Cl. 73—144 **6 Claims**



1. A device for contacting a strip issuing relative to a rolling mill for performing separate sets of functions on said strip, such as a combined shapemeter-looper function and a shapemeter-tensiometer function, comprising:

a frame,

an actuator supported by said frame,

a roller means connected to said actuator for displacement thereby in a manner to contact substantially the entire width of said strip to assume a force transmitting relationship relative thereto,

said roller including means sensitive to the shape of said strip and for producing a representation of said shape,

means for causing said roller means to move through a relatively large working range which corresponds to said shapemeter-looper function and for positioning said roller in a substantially fixed location relative to a strip datum position which corresponds to said shapemeter-tensiometer function, and

means for causing said roller means to perform selectively said separate sets of functions.

4,004,460

SHIP MOVEMENT MEASUREMENT

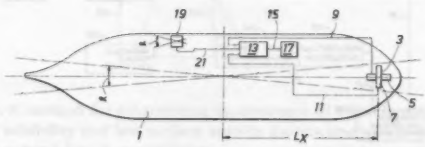
Sydney L. Whipps, Doddinghurst, England, assignor to Shell Oil Company, Houston, Tex.

Filed Oct. 14, 1975, Ser. No. 621,783

Claims priority, application United Kingdom, Oct. 24, 1974, 46032/74

Int. Cl.² G01C *21/00*

U.S. Cl. 73—178 R **6 Claims**



1. Method for determining the movement of a ship comprising:

measuring the longitudinal and lateral velocity of the ship at an aeration-free location at the bottom of the ship;

measuring the rate-of-turn of the ship about its vertical axis;

generating signals representing each of the measured values;

visually displaying the magnitude of the signal representing the longitudinal velocity as a vertical displacement of a horizontal line from a neutral horizontal axis;

visually displaying the signal representing the lateral velocity as a horizontal displacement of a vertical line from a neutral vertical axis, said displays of longitudinal and lateral velocity being superimposed and having the same horizontal and vertical scales;

visually displaying the magnitude of the signal representing the rate-of-turn; and

superimposing on the display of longitudinal and lateral velocity a monogram for indicating the drift angle of the vessel resulting from the longitudinal and lateral velocities.

4,004,461

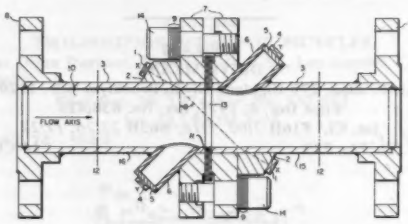
ULTRASONIC MEASURING SYSTEM WITH ISOLATION MEANS

Lawrence C. Lynnworth, Waltham, Mass., assignor to Panametrics, Inc., Waltham, Mass.

Filed Nov. 7, 1975, Ser. No. 629,870

Int. Cl.² G01F *1/66*

U.S. Cl. 73—194 A **16 Claims**



1. An apparatus for measuring the ultrasonic response characteristics of a fluid flowing within a conduit having walls formed of a high acoustic impedance material comprising,

a first transducer mounted on said conduit wall in a first position for transmitting a beam of ultrasonic energy through a portion of said conduit wall into said fluid;

a second transducer mounted on said conduit wall at a second position spaced apart from said first position, said second transducer producing output signals in response to received ultrasonic energy;

an opening in said conduit wall between said first and second positions separating said conduit into first and second separate segments, said first transducer position being located within said first segment and said second transducer position being located within said second segment; and

a sealant material confined to the opening between the first and second segments of said conduit to seal said first and second segments together, said sealant material having an acoustic impedance low in comparison to the acoustic impedance of said conduit walls, thereby forming an acoustic mismatch to ultrasonic energy transmitted from said first segment to said second segment through the walls of said conduit.

4,004,462

TEMPERATURE TRANSDUCER

Robert C. Dobkin, Atherton, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed June 7, 1974, Ser. No. 477,323

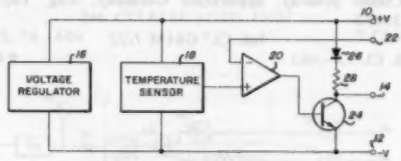
Int. Cl.² G01J *5/00*

U.S. Cl. 73—362 R **23 Claims**

1. A temperature sensor, comprising:

a first transistor having a first parameter thereof which is proportional to temperature and to a second parameter thereof,

a second transistor having a first parameter thereof which is proportional to temperature and to a second parameter thereof,



means for maintaining the ratio of the value of said second parameter of said first transistor to the value of said second parameter of said second transistor constant with changes in temperature and at a value different than one, and

means for sensing the difference between the values of said first parameters.

4,004,463

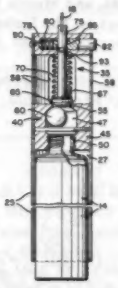
FLUID SAMPLING DEVICE

Carl Fredrick Puthoff, Cincinnati, and James John Gardner, Hamilton, both of Ohio, assignors to Fluid Kinetics, Inc., Fairfield, Ohio

Filed Jan. 26, 1976, Ser. No. 652,468

Int. Cl.² G01N *1/12*

U.S. Cl. 73—425.4 R **9 Claims**



1. A fluid sampling device, which may be lowered by a cord into a pool of fluid to sample the fluid at a particular depth without cross contamination of the fluid sample obtained, comprising:

housing means for holding a sample bottle to be filled with the fluid sample,

remotely operable valve means, attached to the cord and mounted on said housing means, for positively preventing fluid from entering said bottle until said cord is abruptly jerked, and

automatically closing valve means for sealing said bottle in response to said bottle being filled with fluid, whereby the fluid sample obtained in said bottle will not be contaminated by fluid from other levels as said sampling device is raised from said pool of fluid.

4,004,464

METHOD AND TRANSDUCER AND APPARATUS FOR SELECTIVELY MEASURING OSCILLATION COMPONENTS FROM AN OSCILLATION SPECTRUM

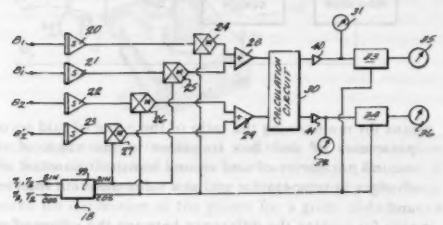
Günther Himmler, Darmstadt, Germany, assignor to Gebr. Hofmann KG Maschinenfabrik, Darmstadt, Germany

Filed Aug. 12, 1975, Ser. No. 603,970

Claims priority, application Germany, Aug. 14, 1974, 2439072

Int. Cl.² G01M 1/22

U.S. Cl. 73—462 **9 Claims**



1. A method of selectively measuring oscillation components and oscillation vectors of a rotor in an oscillation spectrum with a transducer, comprising the steps of applying the oscillation movement to an induction device forming part of the transducer, providing a magnetic alternating field having an adjustable frequency which is kept constant at an integral multiple of the rotor frequency, producing from the operating movement of the induction device in the magnetic field an electrical alternating current voltage and integrating said voltage to produce a signal which is proportional to the amplitude of the oscillation component which is selected by the set adjustment of said constant frequency.

4,004,465

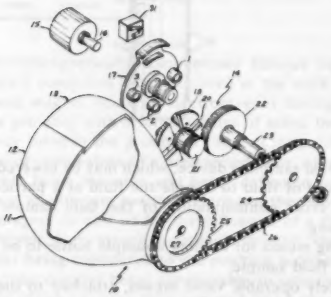
OPTICAL WINDOW PROTECTIVE SHUTTER MECHANISM

Richard A. Dinges, Resda, and Morris Weber, Sherman Oaks, both of Calif., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jan. 20, 1976, Ser. No. 650,590

Int. Cl.² F16H 27/04, 55/04

U.S. Cl. 74—84 R **9 Claims**



1. A visor-like, shutter mechanism comprising; a plurality of separate cover members mounted for pivotal movement about and progressively varying in radius relative to, a common pivot; a cover control drive means interconnected in driving relation with said shutter mechanism for respectively repositioning said separate cover members between a first, open, retracted, inactive and nested relation to each other, and a second, closed, extended and active position; said cover control drive means comprising; a reversible drive motor including a drive shaft; a Geneva-type mechanism comprising; a first drive element in operable relation to, and being driven by said drive shaft, a first driven element incorporating an output shaft, and first, periodically-effective and selectively operative interconnecting-drive actuating means disposed with, and between said first drive element and said first driven element; second, cover member - actuating means incorporating and being driven by said output shaft, and further including adjustably positionable means directly interconnected with the outermost cover member; said cover members incorporating overhanging lip portions on their forward and trailing edges respectively engageable with each other to thereby ensure the collective repositioning of all of the said cover members either to their closed or open positions when the said outermost cover member is being pivoted by said cover control drive means; and periodically-operative, locking means disposed between said first drive element and said first driven element automatically effective during the final pivoted movement of said plurality of cover members either to their closed or open positions to provide a predetermined dwell period during which the first driven element is locked in its final angularly adjusted position and the first drive element is allowed to move in angular position relative thereto in the time required to fully stop operation of the drive motor to thereby prevent any inadvertent damage.

4,004,466

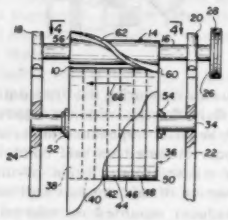
DRIVE MEANS

Louis P. Alba, 279 Highland Blvd., Brooklyn, N.Y. 11207

Filed Dec. 8, 1975, Ser. No. 638,421

Int. Cl.³ F16H 7/00, 7/18; B65H 25/26, 17/22

U.S. Cl. 74—229 **14 Claims**



1. Drive means for a sheet, tape, loop, belt, etc. that will drive same in a straight path, said drive means comprising:

support means for the sheet;

rotatable drive roller means operatively arranged with respect to said support means to move said sheet therebetween,

said drive roller means having a drive surface that provides cyclic line contact back and forth across the sheet and thereby oppose forces tending to cause said sheet to wander from a straight path.

4,004,467

CONVEYOR BELTING

Michael John Kenney, Sutton Coldfield, England, assignor to Dunlop Limited, London, England

Continuation of Ser. No. 382,339, July 25, 1973, abandoned. This application Apr. 11, 1975, Ser. No. 567,310

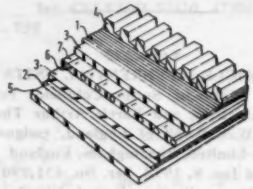
Claims priority, application United Kingdom, Aug. 3, 1972, 36219/72

Int. Cl.² F16G 5/16, 1/00, 1/22

U.S. Cl. 74—233 **12 Claims**

1. A longitudinally flexible passenger carrying belt which is substantially rigid transversly comprising a core of flexible compounded polymeric material and at least two spaced-apart

layers one on each side of the core, each layer having a plurality of high modulus transverse elements, the elements in each layer being substantially straight and individually flexible and positioned substantially at right angles to the length of the belting, the said transverse elements being bonded to a polymeric material wherein the average hardness of the compounded polymeric material of the core is at least 75 BS degrees of hardness whereby the spacing of the layers of transverse elements and the average hardness of the compounded material core confer on the belting a substantial degree of transverse rigidity.

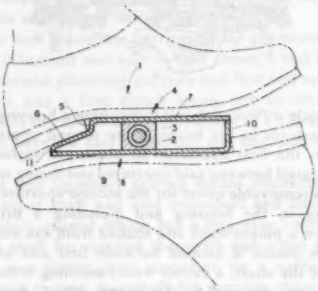


4,004,468

TWO-POSITION PEDAL FOR BICYCLES

Roger Owen Durham, 3944 Marathon St., Los Angeles, Calif. 90029

Filed Dec. 30, 1974, Ser. No. 537,582
Int. Cl.² B62M *3/08*
U.S. Cl. 74—594.4 **1 Claim**



1. A two-position bicycle pedal, for use by a cyclist wearing shoes with heels, comprising;

a. a pedal spindle, said pedal spindle threaded at one end to engage a bicycle crank;

b. a spindle housing rotatably supported by said pedal spindle;

c. a top plate secured to said spindle housing, said top plate having a top deck area adapted for supporting the sole of the cyclist's shoe, a heel stop adjacent said top deck area, said heel stop adapted for engaging the forward face of the heel of a cyclist's shoe, said heel stop located so as to approximately position the arch of the cyclist's foot over said pedal spindle, and a heel step adjacent said heel stop, said heel step adapted for supporting the heel of the cyclist's shoe;

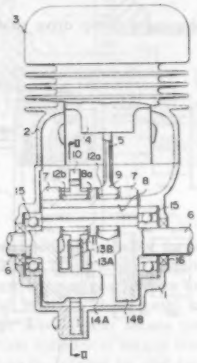
d. a bottom plate secured to said spindle housing, said bottom plate having a bottom deck area adapted for supporting the sole of the cyclist's shoe, said bottom plate having a heel stop adapted for engaging the forward face of the heel of the cyclist's shoe, said heel stop located so as to position the ball of the cyclist's foot over said pedal spindle.

4,004,469

PISTON-CRANK MECHANISM FOR INTERNAL COMBUSTION ENGINES

Soichiro Kosugi, Iwata, Japan, assignor to Yamaha, Hatsudoki Kabushiki Kaisha, Iwata, Japan

Filed Mar. 20, 1975, Ser. No. 560,519
Claims priority, application Japan, Mar. 25, 1974, 49-33851[U]
Int. Cl.² F16F *15/26, 15/28*
U.S. Cl. 74—604 **7 Claims**



1. A piston-crank mechanism for an internal combustion engine, which comprises a piston, a crankshaft having a crank pin, a connecting rod for connecting the piston with said crank pin, an externally toothed gear disposed in side-by-side relationship with respect to the connecting rod and supported for rotation on a pin member extending axially from the crank pin, an internally toothed stationary gear having a number of teeth twice that of the external gear and meshing with the external gear, a pair of rotating balance weights provided on the external gear at the opposite sides thereof in such a manner that they will be in the lower position when the crank pin is in the top dead center, each of said rotating balance weights having substantially the same configuration and mass so that the center of gravity of said weights will lie in the plane of the external gear and thus prevent twisting moment about the support for the external gear, and revolving balance weight means provided on the crank shaft on the side opposite to the crank pin.

4,004,470

DRILLING APPARATUS FOR DRILLING SMALL DIAMETER BORE HOLES DEEP INTO THE EARTH

Theodore B. Houck, Tulsa, Okla., assignor to Parker Drilling Company, Inc., Tulsa, Okla.

Continuation of Ser. No. 445,131, Feb. 25, 1975, abandoned, which is a continuation-in-part of Ser. No. 344,090, April 23, 1973, Pat. No. 3,933,059, which is a division of Ser. No. 194,182, Nov. 1, 1971, Pat. No. 3,767,329. This application Sept. 15, 1975, Ser. No. 613,773
Int. Cl.² F16H *37/06*
U.S. Cl. 74—661 **2 Claims**

1. Apparatus for powering a drilling rig comprising:

a draw works;

a first engine having a transmission with a first engine drive shaft;

a second engine having a transmission with a second engine drive shaft;

a draw works drive sprocket on said second engine drive shaft and means to rotatably connect said draw works drive sprocket to said draw works;

a first input shaft detachably connected to said first engine drive shaft;

a second input shaft detachably connected to said second engine drive shaft;

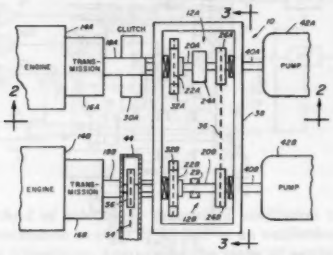
a pump drive sprocket and a shaft coupling sprocket in tandem on said first input shaft;

a coupling clutch in said first input shaft between said first pump drive sprocket and said shaft coupling sprocket, the clutch having an engaged position and a disengaging position;

a pump drive sprocket and a shaft coupling sprocket in tandem on said second input shaft;

a first pump having a pump drive shaft and a sprocket thereon;

a second pump having a pump drive shaft and a sprocket thereon;



a chain coupling said pump drive sprocket on said first input shaft with said first pump shaft sprocket;

a chain coupling said pump drive sprocket on said second input shaft with said second pump shaft sprocket; and

a chain connecting said shaft coupling sprockets of said first and second input shafts;

said input shafts, said pump and coupling sprockets thereon, said coupling clutch, said pump drive shafts and sprockets thereon, and said chains being housed together in a power unit for transportation separate from said engines, pumps and draw works and whereby said draw works may be powered by said second engine alone when said coupling clutch is disengaged or by said first and second engines together when said coupling clutch is engaged.

4,004,471

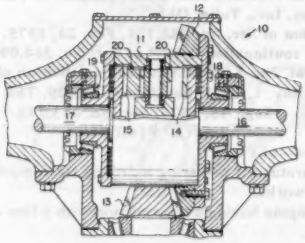
DIFFERENTIAL WITH SPHERICAL BEARING SUPPORTED PINIONS

Frank E. Keske, Chillicothe, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 28, 1975, Ser. No. 563,270

Int. Cl.² F16H *1/42, 1/44*

U.S. Cl. 74—714 **6 Claims**



1. In a differential of the type comprising a pair of opposed face gears, a rotatable carrier disposed between said face gears and a plurality of pinion gear means rotatably mounted on said carrier with at least some of said pinion gear means meshing with said face gears for differentially permitting one face gear to rotate faster than the other face gear, the invention wherein each of said pinion gear means is mounted on a separate shaft having each end thereof rotatably mounted on said carrier by a spherical bearing means for providing a crowned bearing surface area contact therein upon imposition of loads thereon during operation of said differential.

4,004,472

VEHICLE DIFFERENTIAL UNITS

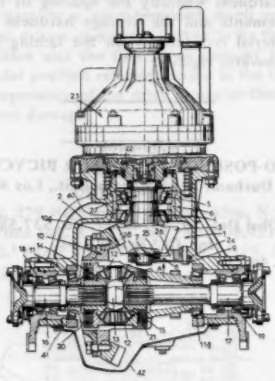
Thomas Hughes Millward, Sutton Coldfield; Terence Leslie Eustace, Birmingham, and Barrie Arthur Thompson, Aldridge, near Walsall, all of England, assignors to GKN Transmissions Limited, Birmingham, England

Filed Jan. 8, 1974, Ser. No. 431,790

Claims priority, application United Kingdom, June 23, 1973, 29928/73

Int. Cl.² F16H *1/40*

U.S. Cl. 74—713 **12 Claims**



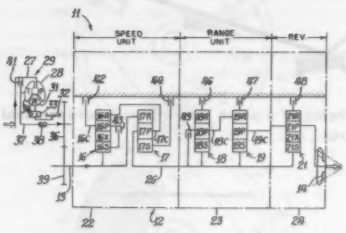
1. A vehicle differential unit comprising a housing, first and second apertures in the housing, the second aperture being larger than the first aperture, an abutment surface on the housing located between said apertures and facing said second aperture; a removable cover for the second aperture; differential gearing in the housing and including a drive pinion mounted on a pinion shaft and spaced from the ends thereof so that the pinion is located between first and second end portions of the shaft, a crown wheel meshing with the drive pinion, a cage secured to the crown wheel, bevel pinions carried by the cage and output bevel gears meshing with the bevel pinions; an outer bearing assembly in said first aperture and in which the first end portion of the pinion shaft is supported, the first aperture being of insufficient size to allow the drive pinion to pass therethrough so that the first end portion of the shaft can only be mounted in said outer bearing by inserting the pinion and shaft into the housing through the second aperture which is of a size sufficient to pass the drive pinion; an inner bearing assembly for the second end portion of the shaft; a bearing support separate from the housing and having an aperture which receives said inner bearing assembly and an abutment surface facing said first aperture and engaged with said abutment surface on the housing, said engaged abutment surfaces being located in an arc around the rotary axis of the drive pinion shaft; releasable means securing the bearing support to the housing with said abutment surfaces in engagement so that the bearing support can be inserted into the housing through the second aperture and, after the first end portion of the pinion shaft has been received in the outer bearing assembly, the inner bearing assembly can be located on the second end portion of the shaft and the releasable means then engaged to secure the bearing support to the housing.

4,004,473

BROAD RANGE FLUID AND MECHANICAL POWER TRANSMISSION FOR VEHICLES OR THE LIKE

Shairyl I. Pearce, East Peoria; Gerald B. Ireland, Morton, and Willis E. Windish, Pekin, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Nov. 29, 1973, Ser. No. 420,063
Int. Cl.² F16H 57/10, 47/00
U.S. Cl. 74—759 1 Claim



1. A transmission for connection between an engine and mechanism driven thereby comprising:

a transmission housing,

an input shaft, a mainshaft and an output element,

a torque converter having a pump element with means for receiving drive from said engine and having a turbine element coupled to said input shaft, and lock-out means for selectively locking said means for receiving drive from said engine to said means for driving said input shaft to bypass said torque converter,

a range unit planetary gearing means connected between said mainshaft and said output element and having first and second planetary gearsets and first and second brake means and a first clutch means for conditioning said gearsets to provide any selected one of a plurality of drive ratios between said mainshaft and said output element, and

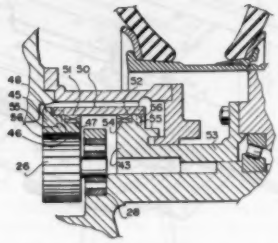
a speed unit planetary gearing means connected between said input shaft and said mainshaft and having a third planetary gearset which has a ring gear coupled to said input shaft for rotation therewith and a sun gear and at least one planet gear supported on a carrier which is coupled to said mainshaft for rotation therewith and a third brake means for selectively locking said sun gear against rotation, said speed unit planetary gearing means further having a fourth planetary gearset with a sun gear coupled to said input shaft for snychronous rotation with said input shaft and with said ring gear of said third planetary gearset, and a ring gear coupled to said carrier of said third planetary gearset to rotate synchronously therewith, and at least one secondary planet gear engaged with said sun gear of said fourth planetary gearset and at least one primary planet gear engaged with said secondary planet gear and also being engaged with said ring gear thereof, a fourth planetary gearset carrier supporting said primary and secondary planet gears, fourth brake means coupled between said fourth planetary gearset carrier and said housing for selectively locking said primary and secondary planet gears against orbital motion around said sun gear of said fourth planetary gearset, and second clutch means for locking up said speed unit planetary gearing means to cause said input shaft and said mainshaft to turn in synchronism, said second clutch means being coupled between said carrier and sun gear of said fourth planetary gearset.

4,004,474

TORQUE TRANSMITTING ASSEMBLY

Stanley H. Moore, Coquitlam, Canada, assignor to Wescan Mining Trucks & Equipment Ltd., Vancouver, Canada

Filed Jan. 6, 1975, Ser. No. 538,775
Claims priority, application Canada, Oct. 1, 1974, 210513
Int. Cl.² F16H 1/28
U.S. Cl. 74—801 18 Claims



1. A torque transmitting assembly for a wheel drive train comprising a rotatable internal gear member having internal gear teeth and first annular gear means located radially outwardly from said internal gear teeth, said gear member adapted to engage driving gear means mounted within said gear member; a first cylindrical torque transmitting torsional member adapted to be rotated by said gear member, having primary annular gear means disposed about the interior of said first torsional member located substantially at one end thereof and adapted to engage said first gear means, and having secondary annular gear means disposed about the interior of said first torsional member, located substantially at the other end thereof, and axially spaced from said primary gear means; a second generally cylindrical torque transmitting torsional member having second annular gear means at only one end thereof in mating engagement with said secondary gear means, said second torsional member being rigidly connected at the other end thereof to a hub of a wheel, said second annular gear means being arranged on an outer surface of said second torsional member, an open annular space formed between the ends of said first torsional member, bearing means to support said driving means at one side thereof being disposed in said space, and whereby in operation, driving torque is transmitted from said driving gear means to said second torsional member via said first and primary gear means, said first torsional member, and said secondary and second gear means, said driving torque causing said second torsional member to rotate and thereby drive said wheel.

4,004,475

PORTABLE WRENCH FOR ROTARY MEMBERS

Hugh H. Pase, Cheshire, Conn., assignor to Mimco Incorporated, Cheshire, Conn.

Continuation of Ser. No. 447,007, Feb. 28, 1974, abandoned. This application Aug. 8, 1975, Ser. No. 603,161
Int. Cl.² B25B 17/00
U.S. Cl. 81—57.14 12 Claims

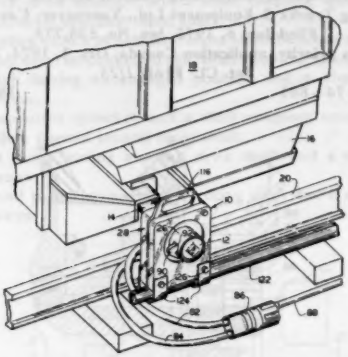
1. A portable high-torque wrench for rotating a cylindrical capstan having a transverse hole in the periphery thereof by which to rotate it, said wrench comprising in combination

a frame having a central opening therein,

a cylindrically hollow hub rotatably supported within the central opening of said frame and open at least at one end to receive and completely surround said capstan substantially within a plane of rotation disposed perpendicular to said capstan,

means for rotating said hub and

a locking dog mounted on said hub substantially in said plane of rotation and having a portion slidably movable



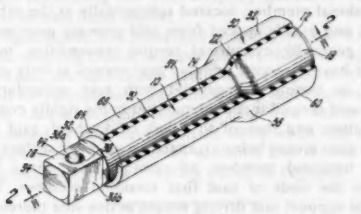
radially into and out of said hole in said capstan for driving engagement therewith.

4,004,476

SOCKET WRENCH EXTENSION GRIP

Kenneth L. DeVrou, 1898 Newcastle Drive, Jenison, Mich. 49428

Filed July 21, 1975, Ser. No. 597,833
Int. Cl.² B25B *23/00*
U.S. Cl. 81—177 A **2 Claims**



1. In combination, a socket wrench extension having a drive receiving first end portion, a shank portion, and a socket mounting second end portion and a hand grip for assisting direct manual grasping and turning of the socket wrench extension, said hand grip being tightly positioned upon said drive receiving first end portion and said shank portion of said socket wrench extension whereby said socket wrench extension can be directly manually grasped by said hand grip and manually turned.

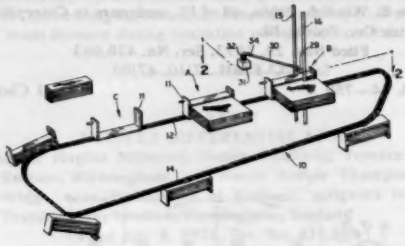
4,004,477

FABRIC CUTTING APPARATUS

William O. Mitchell, and Billy R. Moore, both of Vidalia, Ga., assignors to Oxford Industries, Inc., Atlanta, Ga.

Filed June 2, 1975, Ser. No. 582,723
Int. Cl.² B26D *1/52*
U.S. Cl. 83—23 **13 Claims**

1. Apparatus for cutting a stack of pattern pieces or the like comprising a pair of band knives having a vertical portion, said vertical portions of said pair of band knives being parallel to each other and spaced apart a distance equal to the width to which the pattern pieces are to be cut, conveying means extending between said pair of band knives, at least one clamp member carried by said conveying means, said clamp member being adapted to receive a stack of fabric and including a base plate for receiving said stack of fabric, a hold-down plate removably connectable to said base plate for holding a stack of fabric on said base plate, said hold-down plate and clamp



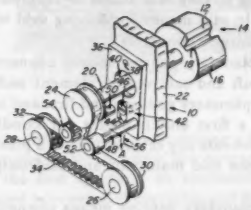
member being of a width that will pass between said pair of band knives.

4,004,478

APPARATUS FOR ADJUSTING THE POSITION OF A ROTATABLE CUTTER MECHANISM

Gaylard M. Morgan, Saxton, Pa., assignor to F. L. Smithe Machine Company, Inc., Duncansville, Pa.

Filed Jan. 20, 1976, Ser. No. 650,630
Int. Cl.² B26D *1/56*
U.S. Cl. 83—331 **9 Claims**



1. Apparatus for adjusting the position of a rotatable cutter mechanism comprising,

a frame member,

a cutter shaft rotatably supported in said frame member,

a driven pulley nonrotatably connected to one end portion of said cutter shaft,

a plate member pivotally connected to said frame member and having an aperture through which said cutter shaft extends,

said plate member having a slot therein,

a cam member eccentrically mounted for rotation on said frame member,

said cam member positioned in said slot of said plate member and secured thereto,

said cam member arranged to rotate in a preselected direction through a preselected angle on said frame member and thereby pivot said plate member on said frame member in a corresponding direction and through a corresponding angle,

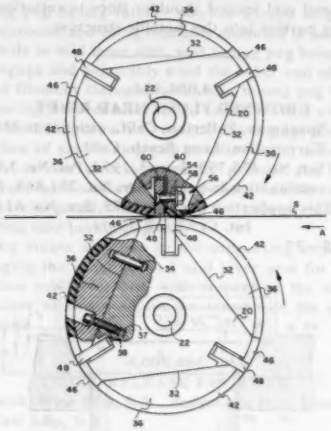
drive means drivingly connected to said driven pulley for rotating said driven pulley at a preselected speed, and

rotatable means secured to said plate member and engaged to said drive means for turning said drive means upon pivotal movement of said plate member to rotate said driven pulley through a preselected angle and thereby adjust the angular position of said cutter shaft relative to the moving web.

4,004,479
SCRAP CHOPPER

Ernest Robert Bodnar, 29 Blackdown Crescent, Islington (Toronto), Ontario, Canada

Filed Feb. 5, 1975, Ser. No. 547,365
Int. Cl.² B23D 25/12
U.S. Cl. 83—345 5 Claims



1. A rotary chopper for strip sheet material, for chopping the strip thereof into shorter lengths, said chopper comprising;

upper and lower shaft members;

mounting means for supporting said upper and lower shaft members parallel with one another, and drive means for driving the same in unison in opposite directions;

a roll core member mounted on each said shaft member each said core member being of generally triangular shape in section, having three generally flat segment mounting surfaces, and three tread mounting corners;

a blade mounting surface formed at each said corner, being oriented to lie in a predetermined plane, the planes of the three said blade mounting surfaces intersecting at about the center of said triangular shape of said core member;

a chopper blade mounted on each said blade mounting surface, with an edge portion thereof extending outwardly beyond said tread mounting surface of said core member;

resilient tread means mounted on each of said corners, adjacent said projecting edge portion of said blade member;

three roll segment portions for each said core member each having generally flat interior mounting surfaces, and generally semi-cyindrical exterior tread mounting surfaces, attachment means for attaching a said segment portion on a said generally flattened surface of a said core member;

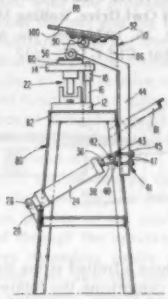
resilient tread means attached over said semi-cylindrical tread mounting surface of each said segment portion, said resilient tread portions on said segment portions being of the same thickness, and radius of curvature as the tread portions on said corners, whereby to define a cylindrical resilient tread surface, with said edge portions of said blade members lying on the periphery of said cylindrical surface, and

said tread portions being resilient and deflectible, in response to pressure from a blade member of an adjacent core, whereby to permit an overlapping shearing action to take place between said blade members on adjacent said core members, whereby said resilient tread portions will provide a constant frictional gripping action on said strip during chopping.

4,004,480
PRESS

Francis J. McCabe, 239 Hastings Court, Doylestown, Pa. 18901

Filed Jan. 21, 1976, Ser. No. 650,926
Int. Cl.² B26D 5/12
U.S. Cl. 83—530 13 Claims



1. In a press having a fixed portion, a movable portion which moves along a preselected path of travel with respect to said fixed portion, and actuating means for transmitting force to said movable portion, an improved force amplification means comprising:

a. lever means pivotally attached to said movable portion;

b. fulcrum bearing surface means connected to said lever means for movement therewith; and

c. fulcrum bearing means for engaging said bearing surface means, said fulcrum bearing means comprising:

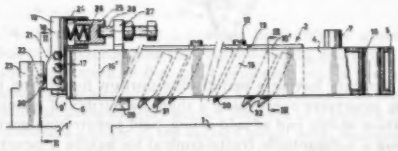
i. fulcrum cradle means for allowing said bearing surface means to rotate, and

ii. fulcrum bearing track means for allowing said bearing surface to reciprocate along an axis which intersects said preselected path of travel.

4,004,481
DEVICE FOR MAKING A PERFORATION IN FILM MATERIAL

Paul Christian Herman van den Beld, Hardenberg, Netherlands, assignor to Wavin B.V., Zwolle, Netherlands

Filed June 24, 1975, Ser. No. 589,684
Claims priority, application Netherlands, June 26, 1974, 7408625
Int. Cl.² B26D 5/08
U.S. Cl. 83—555 6 Claims



1. Apparatus for perforating film material such as plastic film material comprising a beam, a plurality of perforating blades having a saw-tooth shape supported on said beam, table means arranged in confronting relation to said blades for supporting the material to be perforated, means for vertically reciprocating said beam between a first operative position adjacent said table means and a second operative position spaced from said table means, suction means associated with said beam and vertically movable therewith for releasably holding at least a top layer of the material to be perforated in engagement with said blades during reciprocation of said

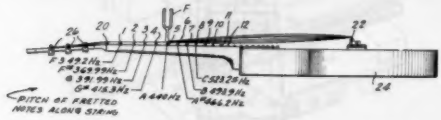
beam from said first to said second operative position, and means for longitudinally moving said blades relatively of said suction means and the material to be perforated during reciprocation of said beam from said first to said second operative position.

4,004,482

METHOD OF TUNING FRETTED INSTRUMENTS

Jeffery L. Yates, 3304 Owl Drive, Rolling Meadows, Ill. 60008

Filed Sept. 25, 1975, Ser. No. 616,851
Int. Cl.² G10G *7/02*
U.S. Cl. 84—455 **6 Claims**



1. A method of tuning a fretted string instrument, such, for example, as a guitar comprising the following steps:

placing the end of a vibrating tuning fork of predetermined pitch in contact with a string to be tuned;

sliding the vibrating tuning fork along the string until the pitch of the vibrating tuning fork becomes audible;

adjusting the tension of the string being tuned until the pitch of the tuning fork becomes audible at the coincident point, that is, the point at which sympathetic resonance takes place when the string being tuned is at its proper pitch.

4,004,483

FASTENER FOR ATTACHMENT TO METALLIC STRUCTURES

Robert L. Hallock, 7136 NE. 8th Drive, Boca Raton, Fla. 33432

Filed Jan. 12, 1976, Ser. No. 648,212
Int. Cl.² F16B *15/00, 39/00*
U.S. Cl. 85—10 E **3 Claims**

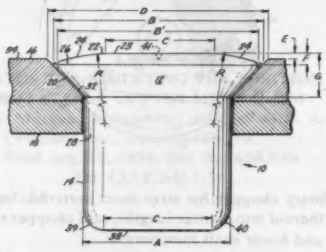
1. A fastener having a penetrating portion for driving into metallic structures comprising a shank, a hardened penetrating portion at one end of said shank, said penetrating portion including a substantially frusto-conical tip having a penetrating point at one end and a predetermined diameter at the opposite end, a reduced neck formed at said opposite end of said tip defining an annular groove having a cross-sectional width substantially greater than the depth, the opposed ends of said neck being of substantially the same diameter, an enlargement connected to said neck and defining a first substantially radial shoulder extending outwardly therefrom for engaging the metallic structure and causing the metal thereof to flow into said annular groove and form a mechanical lock, said enlargement terminating in a second substantially radial shoulder of greater diameter than said first shoulder at said one end of said shank to stop penetration of said penetrating portion into the metallic structure, said enlargement being of a volume at least as great as and approximating the volume of said annular groove to cause the flowing metal to fill said annular groove as said second shoulder stops penetration of said penetrating portion, whereby the penetrating portion of said fastener may be driven into the metallic structure and said first shoulder causes the metal of the metallic structure to flow into the area adjacent to said neck and form a mechanical lock therewith and said second shoulder stops penetration of said penetrating portion into the metallic structure.

4,004,484

CROWNED FLUSH HEAD RIVET

Eugene R. Speakman, Fullerton, Calif., assignor to McDonnell Douglas Corporation, Long Beach, Calif.

Division of Ser. No. 475,793, June 3, 1974, Pat. No. 3,927,458, which is a continuation-in-part of Ser. No. 291,669, Sept. 25, 1972. This application Sept. 8, 1975, Ser. No. 611,023
Int. Cl.² F16B *19/04*
U.S. Cl. 85—37 **4 Claims**



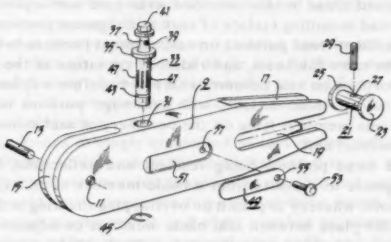
1. A rivet constructed from a material which coldflows when the rivet is driven having a shank portion of a constant diameter and a connected head portion having a frusto-conical undersurface which is flared uniformly outwardly from said shank, an upper surface which is a minor portion of a filled torus in shape so that said upper surface has a central planar portion with a concentric curved portion thereabout, and an outer edge including a cylindrical portion adjacent said concentric curved portion and a radiused portion adjacent said frusto-conical undersurface, said shank portion having a constant diameter throughout a major portion of its length.

4,004,485

MECHANISM FOR ADJUSTING TENSION OF AN ELONGATED FILAMENT

Rolly R. Hiscott, Costa Mesa, Calif., assignor to Ernie Ball, Inc., Newport Beach, Calif.

Filed Aug. 11, 1975, Ser. No. 603,261
Int. Cl.² G10C *3/10;* **G10D** *3/14*
U.S. Cl. 84—207 **5 Claims**



1. A device for adjusting tension of an elongated filament of

which one end thereof is coupled to a supporting structure comprising:

a lever having an opening through one end thereof adapted to be receive and rotate about a pivot shaft fixedly attached to the supporting structure adjacent the other end of the elongated filament, said lever arm having a cylindrical hole therethrough adapted to receive a tuning peg and having a recess adjacent to and intersecting said cylindrical hole;

a tuning peg having ratchet notches spaced longitudinally therearound and being rotatably mounted in said cylindrical hole in said lever arm, said tuning peg being adapted to engage and adjustably wind the other end of the elongated filament therearound as said tuning peg is rotated;

a flat spring member attached to said lever arm and extending into said recess to contact and engage said ratchet notches of said tuning peg to allow said tuning peg to rotate in one direction and to prevent the elongated filament from unwinding therefrom, whereby the tension of the elongated filament may be coarsely adjusted by rotating said tuning peg; and

adjusting means attached to the supporting structure and engaging the other end of said lever arm for rotatably position said lever arm with respect to the supporting structure to finely adjust the tension of the elongated filament.

4,004,486

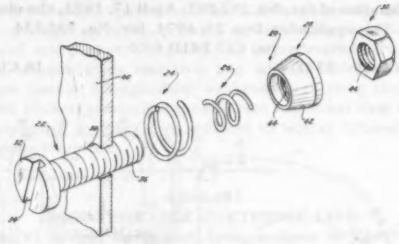
QUICK RELEASE FASTENER

Peter Schenk, West Islip, N.Y., assignor to Dzus Fastener Co., Inc., West Islip, N.Y.

Filed Dec. 8, 1975, Ser. No. 639,004

Int. Cl.² F16B *13/04*

U.S. Cl. 85—64 **6 Claims**



1. A fastener assembly for use in the blind fastening together of first and second parts having aligned apertures extending therethrough with the aperture in the second part being larger than the aperture in the first part, said fastener assembly comprising:

a stud member having a head and a relatively reduced threaded shank adapted to be projected through said aligned apertures with the head being positioned on the outer side of first part and being larger than the aperture therein;

a nut having a threaded aperture therethrough for interengagement with the threaded shank to permit relative rotation therebetween, the nut having a nose portion on its outer surface tapered toward the first part, and the nut having a smaller outer diameter than the aperture in the second part so that it can be projected therethrough with the nut located on the opposite side of the second part from the first part;

a first helical spring having a normal outer diameter larger than the aperture in the first part and smaller than the aperture in the second part assembled around said stud in engagement with the nut and the spring being expandible to have a larger outer diameter than the diameter of the aperture in the second part, the first helical spring being wound in a first direction;

a surface on the end portion of the nut facing the first and second parts adapted to receive one end of a second helical spring, the other end of the second helical spring bearing against the first part, the second spring being assembled around said stud and under compression when the fastener assembly is inserted into the first part so as to exert a constant axial force on the nut to facilitate rotation of the threaded stud with respect to the nut, the second helical spring being wound in a second direction and being wound with end projections so that the ends can bite into both the nut and the first part to facilitate prevention of rotation of the nut when the stud is rotated, the second helical spring being formed with respect to the first helical spring so that relative rotation between the nut and shank to compress the springs will place a greater load on the second helical spring than the first helical spring to further facilitate retention of the nut against rotation when the stud is rotated;

the first and second springs biasing the nut in a direction away from the first and second parts so that when the assembled shank portion of the stud and the spring and nut are inserted through the aperture in the second part with the springs extending under partial compression between the first part and the nut is restrained from rotation by the combined biasing forces of the springs, it will move axially toward the head of the stud to expand the first helical spring into engagement with the second part and retain the second part in fixed relationship with respect to the first part.

4,004,487

MISSILE FIRE-CONTROL SYSTEM AND METHOD

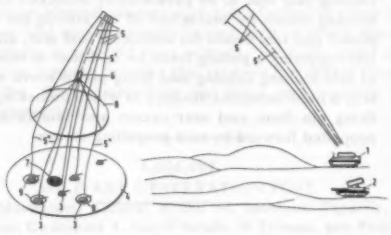
Kurt Eichweber, Holsteiner Chaussee 73-81, 2 Hamburg 61, Germany

Filed Mar. 6, 1975, Ser. No. 555,940

Claims priority, application Germany, Mar. 12, 1974, 2411790

Int. Cl.² F41F *3/04*

U.S. Cl. 89—1.815 **25 Claims**



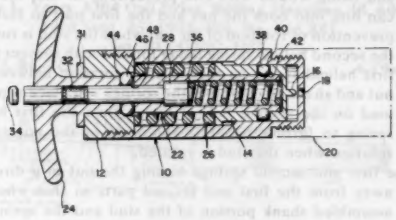
1. A method of firing a combat projectile to a selected surface target comprising the steps of aiming and firing, from a launching station, a first pilot projectile into a first preset ballistic flight trajectory providing a steep descent of the pilot projectile to prospectively impact the area of a surface target, transmitting a picture of the surface target area, including the surface target and its position relative to the prospective point of impact of the pilot projectile, to a fire-control station from the pilot projectile during its descent, displaying the transmitted picture of the surface target area, including the surface target and its said position relative to said prospective impact point, at the fire-control station, and aiming a second combat projectile at the launching station into a desired second preset ballistic flight trajectory to hit the surface target in accordance with the flight trajectory of the pilot projectile and the relative position of the surface target to said prospective impact point in the target area picture displayed at the fire-control station, and firing the aimed combat projectile.

4,004,488

DUAL-MOTION FIRING DEVICE

George B. Williams, King George County, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 1, 1975, Ser. No. 563,994
Int. Cl.² F41F *13/04*
U.S. Cl. 89—27 A 7 Claims



1. A dual-motion firing device comprising:

a housing having front and rear portions;

a firing mechanism substantially internal to said housing means, said firing mechanism including a sear slidable in and extending out of said housing at its rear end portion, a firing pin within said housing that slidably engages an end portion of said sear, means non-permanently locking said firing pin to said sear, and resilient means for propelling said firing pin forward when said firing pin is unlocked from said sear by movement of said sear toward said rear portion of said housing;

an arming mechanism comprising means non-permanently locking said sear to said housing means, and an arming pin slidable within said sear having an arming pin resilient means adjacent its forward end portion and extending out of said sear at its rear end portion, said arming pin being formed with means for unlocking said sear from said housing when said arming pin is moved toward said firing pin to compress said arming pin resilient means;

whereby force on the arming pin moves it into said housing causing said sear to be permanently unlocked from said housing means by interaction of the arming pin resilient means and said means for unlocking said sear, and thereafter applying a pulling force on said sear to move it out of said housing causing said firing pin to move with said sear a predetermined distance at which unlocking of said firing pin from said sear occurs and said firing pin is propelled forward by said propelling means.

4,004,489

DUAL SELECTIVE FEED MECHANISM FOR AUTOMATIC WEAPONS

Curtis D. Johnson, and Fred J. Skahill, both of Davenport, Iowa, assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

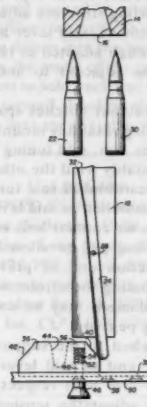
Filed Nov. 3, 1975, Ser. No. 628,032
Int. Cl.² F41D *9/02*
U.S. Cl. 89—33 SF 10 Claims

1. A dual selective feed mechanism for placing cartridges from a pair of ammunition belts into ready to feed positions and chambering cartridges from a selected belt in one of said positions to a chamber position for firing, said mechanism comprising:

a pair of feed sprocket assemblies for moving cartridges in a pair of belts into ready to feed positions,

a bolt carrier adapted to move forwardly to battery position,

a rammer pivotally mounted on said carrier and adapted to strip and chamber cartridges from either belt as said carrier moves to battery position, and selection means



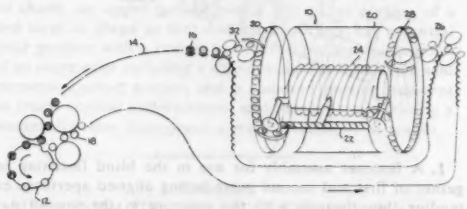
pivotally moving said rammer to strip and chamber cartridges from a selected belt.

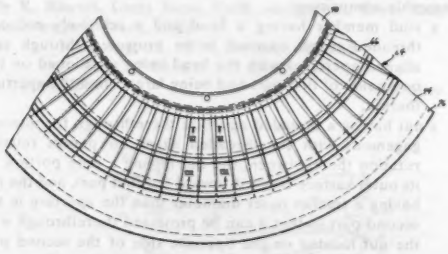
4,004,490

STRUCTURE FOR ARTICLE HANDLING SYSTEMS

Joseph Dix, Williston; Norman Campbell, and Ivar Scott Tonseth, Jr., both of Burlington, all of Vt., assignors to General Electric Company, Burlington, Vt.

Continuation of Ser. No. 352,007, April 17, 1973, abandoned.
This application Dec. 23, 1974, Ser. No. 535,834
Int. Cl.² F41D *9/06*
U.S. Cl. 89—33 D 16 Claims





1. An article handling system for rounds of ammunition each having a necked case and a projectile comprising:

an outer drum having a plurality of mutually spaced apart, centripetally directed, longitudinally extending guides, mutually adjacent guides defining respective channels for receiving longitudinally extending rows of rounds;

an inner shaft means having a helical fin comprising an

integrally continuous folded plate structure spiraling around said shaft means in a plurality of turns;

channel means spiraling around said shaft means in a plurality of turns coextensively with said fin and fastened to and between said shaft means and said fin;

a frist additional pair of respectively integrally continuous guide rings, one on each side of said fin, each respectively spiraling around said shaft means in a plurality of turns coextensive with said fin and fastened thereto at a radial distance whereat each said first guide ring bears against the neck of the case of each round.

4,004,491

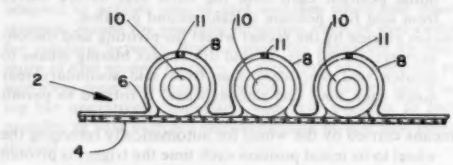
PLASTIC AMMUNITION BELT

Ernest Richard Seeling, Davenport, Iowa, assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sept. 17, 1975, Ser. No. 614,285

Int. Cl.² F42B *39/08*

U.S. Cl. 89—35 R **3 Claims**



1. A cartridge belt comprising a single lower strip of cord reinforced flexible polyester material, an upper strip of polyethylene vinyl acetate film material of lighter weight than said lower strip, said upper strip being heat sealed to said lower strip in transverse spaced intervals to form a plurality of tubular cartridge receiving pockets on said strip transversely thereof, said pockets being disposed in predetermined spaced apart relation along said strip and adpated to receive cartridges therein, a longitudinal weakened area along each one of said pockets remotely disposed from said lower strip which is responsive to being torn incident to lateral removal of a cartridge therefrom.

4,004,492

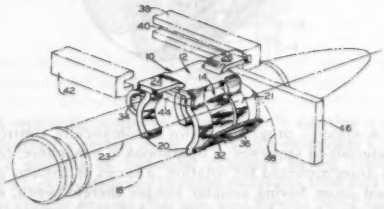
DISINTEGRABLE CARTRIDGE LINK

Giulio V. Savioli, Davenport, Iowa, assignor to The United States of America, Washington, D.C.

Filed Sept. 17, 1975, Ser. No. 614,284

Int. Cl.² F42B *39/08*

U.S. Cl. 89—35 A **5 Claims**



1. An articulated belt for conveying a plurality of elongate objects, said belt including:

a series of links each consisting of a holding element for engaging one of said objects and a tension element for nesting engagement with said holding element,

said holding element having a substantially planar body portion and at least a pair of flexible arcuate arms carried by said body portion on opposite sides thereof for holding engagement with one of said objects and defining therebetween a space for receiving said tension element,

said tension element having oppositely directed tab means formed thereon adapted to engage a pair of spaced-apart guide tracks, and

said tension element further having releasable securing means on either end thereof for securing said tension element to similar tension elements in an adjoining link in force-transmitting relationship so that all such force is transmitted directly through said tension element while all said gripping force is transmitted through said holding element.

4,004,493

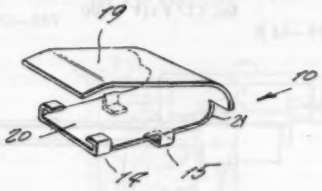
BULLET PROOF GARMENT

Vincent Costanza, P. O. Box 294, Norristown, Pa. 19404

Filed Nov. 26, 1974, Ser. No. 517,381

Int. Cl.² F41H *1/02*

U.S. Cl. 89—36 A **4 Claims**



1. An armored layer adapted to be used in a bullet proof garment, said armored layer comprising a plurality of metallic plates assembled in parallel rows, said plates being aligned both vertically and horizontally in said rows, each of said plates comprising an inner panel and an outer panel, said panels being joined by a U-bend, with the outer panel overlying, but being spaced from, said inner panel, each of said U-bends being at one end of said plate, with the other end of said plate being open, with the end of the outer panel being spaced from the adjacent end of the inner panel, and with a pair of adjacent upper and lower plates being nested together, with the U-bend of one being received in the open end of the other, means pivotally linking each pair of adjacent plates in a given row, and means pivotally linking each vertically aligned pair of plates in adjacent rows, whereby the outer panel of a plate serves a spring function that receives the violent impact of a bullet, thereby absorbing the shock and repelling the bullet penetration.

4,004,494

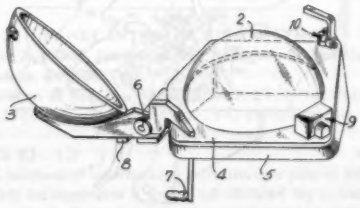
MILITARY OBSERVATION POST

Andre Mechulam, Tarbes; Bruno M. Saintours-Payerne, St Etienne; Guillaume A. Gay-Chatain, St Etienne, and Paul R. Montjallard, St Etienne, all of France, assignors to Etat Francais, Paris, France

Filed Mar. 6, 1974, Ser. No. 448,567

Int. Cl.² F41H *5/22*

U.S. Cl. 89—36 L **13 Claims**



1. An observation post for military equipment comprising a

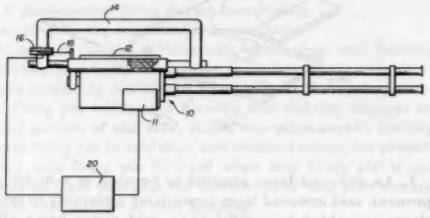
structure having an opening through which at least the head of an observer can pass, and a sealable enclosure for said opening including an inner rigid transparent cap fitted at said opening, a frame carrying said transparent cap, said frame being pivotably mounted on said structure and being sealable thereon so that said opening is covered, an outer armored hatch cover for covering said inner cap, means for selectively opening and closing the outer cover independently of the inner cap, and means supporting said frame of said transparent cap for pivotal movement between open and closed positions independently of said armored cover including a common axle about which said frame of said cap and said armored cover are respectively pivotable.

4,004,495

CONSTANT RECOIL SYSTEM

Warren B. Belfer, Davenport, Iowa, assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 15, 1975, Ser. No. 641,198
Int. Cl.² F41F 19/00
U.S. Cl. 89—42 B **7 Claims**



1. In a recoil assembly adapted for use with an externally driven automatic weapon system including a gun tube assembly having a stationary mount and a motor for actuating operation of said system, the improvement comprising:

sensor means movable with said gun tube and capable of indicating the displacement of the gun tube in any position of recoil or counterrecoil movement, and

control means operatively responsive to said sensor means for controlling operation of said motor,

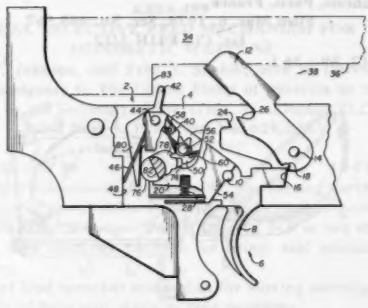
whereby the distance of recoil and counterrecoil travel of said gun tube may be controlled within predetermined limits.

4,004,496

M16A1 BURST CONTROL

Robert E. Snodgrass, Bettendorf, Iowa, and Michael N. Tyler, Illinois City, Ill., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 28, 1976, Ser. No. 691,190
Int. Cl.² F41D 11/10
U.S. Cl. 89—129 B **11 Claims**



1. In a firearm having a receiver including a receiver housing, a pivotable trigger having a primary sear, a disconnect pivotably carried in the housing by the trigger and having a secondary sear, a pivotable hammer in the housing having primary and secondary sear receiving notches to latch the hammer in a cocked position, means normally biasing said disconnect and the secondary sear to a latching position in said seondary sear notch, and recoiling parts, the improvement comprising a burst control assembly in said housing for automatic firing of a preselected number of shots in a burst, said assembly including:

a burst sear device pivotable between a first inactive position and a second pawl activating position,

means for biasing said burst sear device to said first position,

means carried by said recoiling parts for moving said burst sear device from said first position to said second position during counter-recoil movement of said recoiling parts,

a pawl carried by said burst sear device for pivotable movement therewith as the burst sear device moves between said positions,

a ratchet wheel in said housing in position for rotation thereof by said pawl a predetermined distance from an initial position each time the burst sear device moves from said first position to said second position,

means carried by the rachet wheel for pivoting said disconnect against the bias of said disconnect biasing means to unlatch said secondary sear from said secondary sear notch each time said ratchet wheel is rotated to permit the hammer to move to its firing position, and

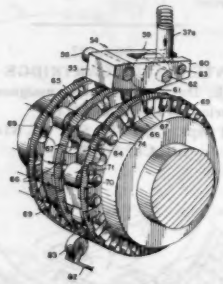
means carried by the wheel for automatically returning the wheel to its initial position each time the trigger is pivoted from a firing position to an inactive position.

4,004,497

AUTOMATIC SYSTEMS PROGRAMMER

Harold W. Scholin, Park Ridge, and Hieronim L. Lisiecki, Chicago, both of Ill., assignors to Scholin Industries, Inc., Chicago, Ill.

Filed May 22, 1974, Ser. No. 472,489
Int. Cl.² F15B 21/02
U.S. Cl. 91—36 **14 Claims**



1. A systems programmer for automatically controlling a predetermined sequence of operations in a machine, comprising a drum mounted for rotation, a series of annular grooves on said drum having annular flanges therebetween, each of said flanges being formed with an annular groove in the periphery thereof and having a plurality of radially extending recesses therein, a series of actuatable members associated with said drum in spaced relation thereto, and positioned along the length thereof, each said member being operable to cause one of a plurality of operations to be performed when actuated, a plurality of cylindrically shaped actuator pins for said members having axially extending end portions of smaller diameter than the central portion thereof, said end portions being removably received in said recesses on said drum along the length thereof in a predetermined arrangement, each

adapted to actuate a selected one of said members during rotation of said drum, an annular yieldable ring member recieved in each of said annular grooves in the periphery of said flanges for retaining said actuators therein, and means to rotate said drum.

13. A systems programmer for automatically controlling a predetermined sequence of operations in a machine, comprising a drum mounted for rotation, a series of actuatable members associated with said drum in spaced relation thereto, and positioned along the length thereof, each said member being operable to cause one of a plurality of operations to be performed when actuated, a plurality of actuators for said members removably mounted on said drum along the length thereof in a predetermined arrangement, each adapted to actuate a selected one of said members during rotation of said drum, a stepping motor for rotating said drum is a step-by-step movement, a plurality of limit switches mounted in side-by-side relation along the length of said drum, each adapted to initiate a signal when actuated to operate said stepping motor to advance said drum, a second plurality of actuators removably mounted on said drum along the length thereof, each adapted to actuate one of said switches when said drum is stepped, means for pivotally mounting each of said switches for rotation between first position for actuation by one or more of said second plurality of actuators, and a second position away from said second plurality of actuators, and a locking bar operatively associated with said switches to lock a plurality of said switches simultaneously in said first position thereof.

4,004,498

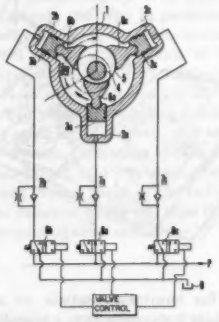
HYDRAULIC MOTOR

Katashi Aoki, Sakaki, Japan, assignor to Nissei Plastics Industrial Co., Ltd., Sakaki, Japan

Continuation-in-part of Ser. No. 441,919, Feb. 12, 1974, abandoned. This application Sept. 8, 1975, Ser. No. 611,113

Int. Cl.² F01B 3/10

U.S. Cl. 91—476 **6 Claims**



1. A hydraulic motor for intermittently rotating a crank shaft through a certain angle only which comprises a crank shaft; a plurality of hydraulic cylinders having respective pistons which are disposed in radial directions from said crank shaft at regular angular intervals, said pistons being engaged with an eccentric member means formed integrally with said crank shaft; a pressure source of oil with separate oil line means connected to each of said hydraulic cylinders; combined check and choke valve means in each of said separate oil line means wherein each combined valve means comprises a check valve operable to allow said oil from said pressure source of oil to flow in said each separate oil line means towards said each cylinder, said each combined valve means further comprising a choke valve in parallel flow relation to said check valve so as to control the flow of discharged oil in each separate oil line means from said each hydraulic cylinder; wherein said each separate oil line means further comprises an externally operated changeover valve means between said each combined check and choke valve means and said pressure source of oil, means for selectively energizing said externally operated changeover valve means to selectively connect, independently of synchronism with said crank shaft, only one of said hydraulic cylinders to said pressure source of oil while venting the oil lines from said other cylinders to an oil tank; and being characterized in that said selective connection of oil pressure to said one cylinder causes said crank shaft together with said eccentric member to selectively rotate for said certain angle only.

4,004,499

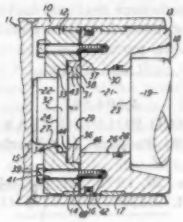
BOLT-ON PISTON ASSEMBLY

Michael J. Beck, Wausau, Wis., assignor to J. I. Case Company, Racine, Wis.

Filed Sept. 17, 1975, Ser. No. 614,149

Int. Cl.² F16J 1/12

U.S. Cl. 92—257 **3 Claims**



1. A bolt-on piston assembly comprising a piston rod having an integral portion projecting radially on said rod, two endlessly circular piston pieces encircling said rod and being disposed on axially opposite sides of said portion and with said pieces each having a surface respectively faced toward said portion to be clamped relative thereto and be axially fixed relative to said rod, said piston pieces each having an outer diameter greater than the outer diameter of said portion to extend radially beyond said portion, said pieces being entirely separated from one another by a space, one of said piston pieces having a section thereof extending axially of said rod and axially over said portion, the surface of said one piston piece being in axial abutment with said portion, the axial length of said section being less than the axial length of said portion for effecting clamping of said pieces onto the projecting said portion and have said pieces without movement axially of and relative to said rod, engagement means interposed between said surface of said other piston piece and said portion, bolts extending into said piston pieces radially beyond said portion for releasably securing said piston pieces on said portion to be axially fixed relative thereto for attaching said piston pieces onto said rod, and a seal member disposed in said space between said piston pieces at the outer diameters of said piston pieces.

4,004,500

PANEL INTERLOCKING METHOD

Prentice J. Wood, Jonesboro, Ga., assignor to The Mead Corporation, Dayton, Ohio

Division of Ser. No. 528,498, Nov. 29, 1974, Pat. No. 3,963,170. This application Mar. 17, 1976, Ser. No. 667,711

Int. Cl.² B31F 5/02

U.S. Cl. 93—1.1 **4 Claims**

1. A method of interlocking portions of a pair of panels one of which incorporates a guide tab defined by a locking slit having a base slit and a pair of spaced locking edges which diverge in a direction away from a portion of one panel and the other panel includes an edge positioning tab and an adja-

cent locking tab having angularly related side edge portions and being hinged to the other panel, the method comprising the steps of swinging said locking tab out of the plane of said other panel through an angle of approximately 180° and into flat face contacting relation with said positioning tab, moving said panels into close generally parallel relation and with said

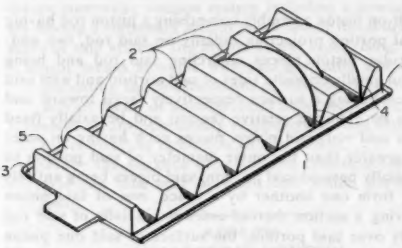
locking and positioning tabs adjacent said locking slit, inserting said positioning tab and said locking tab into said locking slit so that said positioning tab is in face contact with said guide tab, and imparting relative substantially parallel planar movement to the panels such that said locking tab enters said locking slit and swings away from said panels due to its inherent bias to interlock the panels.

4,004,501

TACO HOLDING TRAY

Lois L. Guerrero, 84 Pukihae St., Bayshore Tower, Hilo, Hawaii 96720

Filed Dec. 29, 1975, Ser. No. 644,945
Int. Cl.² A23P *1/00*; A47J *43/20*
U.S. Cl. 99—426 **2 Claims**



1. A taco holding tray to support "V"-shaped taco shells for filling and serving, comprising a tray having a linear trough for supporting taco shells, the length of which trough is at least as along as the length of the taco shell, said linear trough having a rounded bottom to support the normal bending radius of the formed taco shell and outwardly inclined side walls forming an open "V" of about 30° to 45°, the depth of which trough is such that the side walls will support all but enough of the sides of the taco shell for removal of the taco shell from the trough by the fingers, and an overflow catching means at each end of the trough to catch and hold excess filling material from said taco shells.

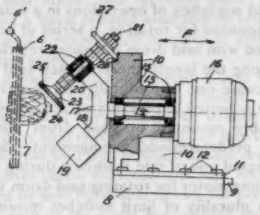
4,004,502

ARTICHOKE SHAPING MACHINE

Giordano Tomelleri, 22 Via Montorio, I-37100 Verona, Italy

Filed July 1, 1975, Ser. No. 592,211
Claims priority, application Italy, Oct. 16, 1974, 84941/74
Int. Cl.² A23N *7/00*; A47J *17/18*; A23N *15/02*; A47J *21/00*
U.S. Cl. 99—593 **4 Claims**

1. A rotating shaping machine for shaving the bases of artichoke hearts, comprising support means, a rotatable shaft mounted in said support means, at least one arm member supported on said rotatable shaft, a rotatable knife means having a frustoconical wall diverging towards an artichoke to be prepared and having a circular cutting edge, said knife means being supported on said arm member so that the axis of said shaft is tangential to the cutting edge to impart an ovoidal



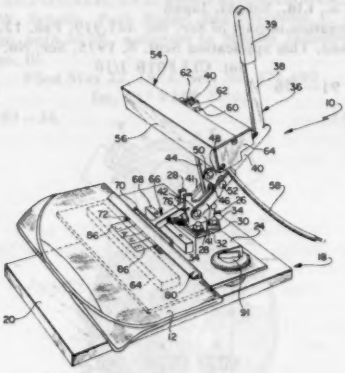
shape to the bottoms of the artichoke hearts, means for rotating the knife means, means for keeping the artichoke co-axial with said shaft, and means for causing one of the knife means and the artichoke to be mutually displaced towards or away from one another.

4,004,503

DEVICE FOR IMPRINTING INDICIA ON A FLEXIBLE ARTICLE

James F. Dwyer, 47 Kenyon St., Providence, R.I. 02903

Filed Jan. 3, 1975, Ser. No. 538,421
Int. Cl.² B44B *5/00*
U.S. Cl. 101—9 **8 Claims**



1. A device for imprinting indicia on a flexible article, wherein the indicia is deposited on a plurality of individually preformed flexible strips, a base, a pad mounted on said base for receiving an article thereon, and defining an imprinting station, stop means mounted on said base adjacent to said pad for locating said article in an oriented imprinting position at said imprinting station, a separately formed and manually movable holder, said holder including an elongated member having longitudinally extending opposed jaws between which said flexible strips are retained, said stop means including a shelf on which said holder is removably mounted for locating said holder in adjacent relation to said flexible article and for positioning said flexible strips in overlying oriented relation on said article, a heating member mounted for movement on said base, and means for moving said heating member into positive engagement with the flexible strips and the indicia deposited thereon that overlies said pad at said imprinting station, wherein the indicia is transferred from said flexible strips by heat from said heating member onto said article.

4,004,504

ARRANGEMENT IN A PRINTER

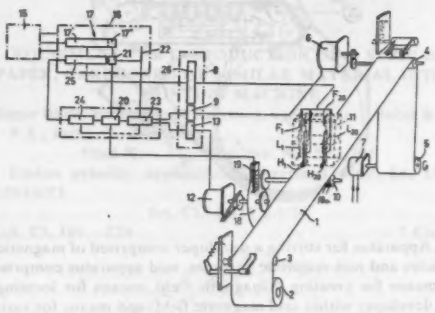
Bengt Oscar Bruno Lundqvist, Bromma, Sweden, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 340,766, March 13, 1973, abandoned, which is a continuation of Ser. No. 162,982, July 15, 1971, abandoned. This application Feb. 20, 1974, Ser. No. 443,975

Claims priority, application Sweden, July 17, 1970, 9946/70

Int. Cl.² B41J 7/92

U.S. Cl. 101—93.03 **6 Claims**



1. In a printer of the kind having a type drum with types arranged linewise around a periphery thereof, a rotatable shaft with said drum being mounted thereon, means for rotating the shaft, a number of movable hammers mounted for producing printing by impact of the hammers against the types on the drum, a respective electromagnet associated with each hammer for activating said hammer, position sensing means for producing a signal indicative of the position of the shaft and of a type which is in position for printing, said types being divisible into a plurality of categories, each category requiring a different hammer impact force for even printing, means for indicating which category the type in position for printing is in, and a memory device for storing information for selecting a type to be printed and electromagnets to be excited, the improvement comprising means for selectively exciting said electromagnets in response to information stored in the memory device, said exciting means including a source of constant current for exciting said electromagnets, and time determining means responsive to said indicating means for varying the excitation time duration of said electromagnets according to the required hammer impact force of the indicated category, said excitation time duration being less than the time required for a hammer to impact against said drum.

4,004,505

ELECTROMAGNETIC STRIKER MECHANISM FOR A PRINTER

Jean Georges Magnenet, Belfort, France, assignor to Compagnie Honeywell Bull (Societe Anonyme), Paris, France

Filed Nov. 5, 1974, Ser. No. 521,023

Claims priority, application France, Nov. 6, 1973, 73.39409

Int. Cl.² B41J 9/02

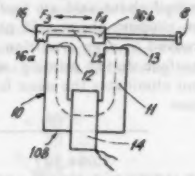
U.S. Cl. 101—93.48 **12 Claims**

1. An electromagnetic striker apparatus for a printer having a type carrier movable before a print support for effecting a print out of the character upon excitation of the striker comprising, in combination:

a magnetic circuit including,

magnetic core means having an electrically excitable coil supported thereon and spaced apart pole pieces having pole faces disposed in a first plane, an armature member supported on said core and having a surface disposed in a second plane parallel to said first plane, a hammer affixed to said armature member, and an air gap of constant dimension being defined between the first plane and the second plane, said armature being disposed adjacent said spaced apart pole faces,

said armature member being movable with said surface remaining in said second plane from a rest position to a strike position upon excitation of said coil whereby said hammer is caused to strike the type carrier which, in turn engages the print support in response to said armature in said strike position, means for biasing said armature



member in the rest position upon removal of excitation from said coil, said magnetic circuit having a first predetermined reluctance in said rest position and a second predetermined reluctance less than said first predetermined reluctance in said strike position, whereby upon movement of said armature member from said rest position to said strike position the reluctance of said magnetic circuit is substantially reduced whenever said coil is excited without changing the dimension of the air gaps defined by said planes.

4,004,506

ENDORSER DRUM HAVING INDEXABLE SELF-ALIGNING PRINT WHEELS

George P. McInerny, Andalusia, Pa., assignor to Brandt-Pra, Inc., Cornwells Heights, Pa.

Filed Feb. 3, 1975, Ser. No. 546,621

Int. Cl.² B41J 1/60

U.S. Cl. 101—110 **22 Claims**

1. An indexable self-aligning printing assembly for mounting upon a holding means comprising:

a mounting pin immovably secured to said holding means and having an annular shaped surface having a polygonal shaped periphery having a cross-sectional configuration comprised of a plurality of spaced, radially outwardly extending projections, the outer free ends of said projections being substantially straight and being parallel to the longitudinal central axis of said pin;

an indexable print wheel being mounted on the pin and being formed of a resilient material and having a closed-loop configuration;

the exterior surface of said print wheel having a plurality of integrally formed raised indicia arranged at spaced intervals along said exterior surface and projecting outwardly therefrom;

the interior surface of said wheel having a configuration of alternating projections and grooves substantially complementary to the configuration of said pin, said wheel being mounted upon and surrounding the periphery of said pin so that the projections of said pin engage selected grooves in said print wheel;

said wheel being adapted to fit upon said pin and experiencing only minimal stretching and deformation when the projections of said pin engage the said selected grooves of said print wheel;

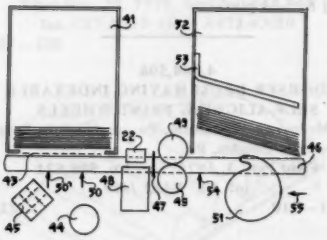
the resilient characteristics of said print wheel permitting said wheel to stretch and permitting the projections of said print wheel to compress when said print wheel is rotated about said pin to enable said print wheel projections to ride over the projections of said pin and to abruptly snap back to their uncompressed or rest state when the projections of said print wheel have passed over the projections of said pin to thereby incrementally index the print wheel about said pin and preventing the print wheel from slipping about said pin when said holding means is moved to urge a portion of the print member against a surface during printing, whereby the aforesaid arrangement eliminates the need for separate additional detent means.

4,004,507

ENVELOPE INDEXING HEAD AND AN INDEXING APPARATUS EQUIPPED WITH SAME

Guy Sautton, Saint Denis, France, assignor to Hotchkiss Brandt Sogeme, Paris, France

Continuation of Ser. No. 509,532, Sept. 26, 1974, abandoned. This application May 24, 1976, Ser. No. 688,986
Claims priority, application France, Oct. 2, 1973, 73.35209
Int. Cl.[2] B41J *9/12*
U.S. Cl. 101—93.42 **6 Claims**



1. An indexing head controlled by a logic device, to print indexing marks on a postal envelope along an indexing line, which comprises:

a plurality of reciprocal elements which are mounted in a receptacle so as to be parallel and longitudinally movable, the number of said elements being the same as the number of strokes which may be printed in the course of the indexing operation, the pitch of said elements being the same as the pitch of said strokes, a forward end of each element being situated along said indexing line and having the height and width of one of said strokes;

a plurality of identical electromagnets, the number of said electromagnets being the same as the number of said elements, each of said electromagnets being mechanically connected to one of said reciprocal elements which is associated therewith, and each of said electromagnets being excitable by an individual specific winding to exert a force upon its associated element for moving said associated element longitudinally forward until it strikes against said postal envelope through the intermediary of an inking ribbon;

said inking ribbon having a portion disposed along said indexing line between said postal envelope and the forward ends of said elements; and

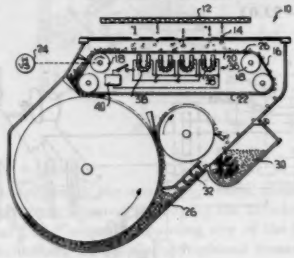
an assembly for receiving and holding immobile said envelope for the duration of the indexing operation, said assembly occupying with respect to said indexing line, a predetermined position with respect to the bottom and forward side of said envelope.

4,004,508

MAGNETIC STIRRING APPARATUS FOR DEVELOPER MIXTURES

Kenneth W. Rarey, South Holland, and John B. Kennedy, Jr., Oak Forest, both of Ill., assignors to Continental Can Company, Inc., New York, N.Y.

Filed Jan. 25, 1971, Ser. No. 109,261
Int. Cl.[2] B41F *15/00*
U.S. Cl. 101—114 **11 Claims**



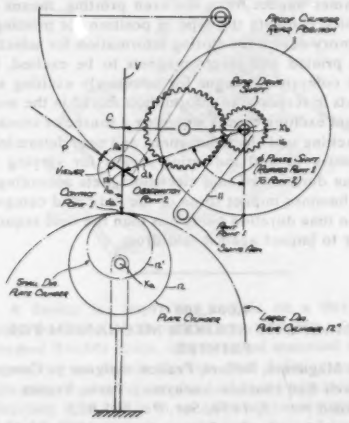
1. Apparatus for stirring a developer comprised of magnetic particles and non-magnetic particles, said apparatus comprising means for creating a magnetic field, means for locating said developer within said magnetic field, and means for variably controlling the field intensity of said magnetic field.

4,004,509

MOUNTING-PROOFING MACHINE

Lester I. Moss, Hackensack, N.J., assignor to Mosstype Corporation, Waldwick, N.J.

Filed Aug. 1, 1975, Ser. No. 601,057
Int. Cl.[2] B41F *17/00, 13/16, 13/44*
U.S. Cl. 101—216 **12 Claims**



1. A mounting-proofing machine to facilitate mounting of flexible printing plates on a plate cylinder preparatory to operation in a flexographic printing press and to obtain proofs from these plates, said machine comprising:

A. a proofing cylinder rotatable about a horizontal axis and means to transfer the proofing cylinder from a forward-position proofing state in which it makes contact with the surface of the plate cylinder to a rear-position mounting state in which it is displaced from the plate cylinder;

B. a retractable viewer which in the mounting state is adapted to observe the surfaces of both cylinders in superposed relation; and

C. elevator means supporting said plate cylinder on an axle for rotation about a horizontal axis and adapted to raise said plate cylinder in a vertical plane which intersects the horizontal axis of the plate cylinder and the horizontal axis of the proofing cylinder in its forward position, said transfer means including a mechanism causing said proofing cylinder to undergo an angular displacement to an extent at which a point printed on the proofing cylinder in the proofing state and corresponding to the point of contact on the plate cylinder assumes an observation point in the mounting state, which in said optical viewer appears to be coincident with the contact point.

4,004,510

EQUIPMENT FOR INTRODUCTION OF A STRIP OF PAPER, CARDBOARD OR SIMILAR MATERIAL INTO A PRINTING MACHINE

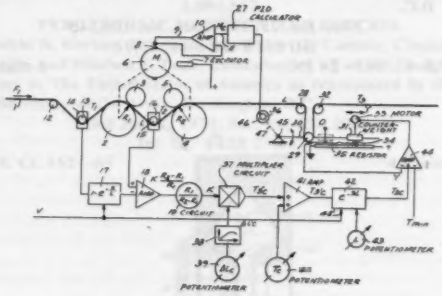
Roger Roch, Lausanne, Switzerland, assignor to J. Bobst & Fils S.A., Prilly, Switzerland

Filed Nov. 11, 1974, Ser. No. 522,706

Claims priority, application Switzerland, Nov. 13, 1973, 15914/73

Int. Cl.² B41F *13/54*

U.S. Cl. 101—228 **7 Claims**



1. In an apparatus for feeding a web of material to a printing machine:

means for continually measuring the coefficient of elasticity of the web and for generating an electrical signal output in response thereto, said continually measuring means comprising means for determining an elongation of the web under given tension conditions, means for sensing said given tension conditions, calculator means for utilizing said determined elongation and said sensed tension to produce a signal which is continually indicative of the coefficient of elasticity of said web; means for utilizing said electrical signal response for developing a tension value signal; electrical-mechanical tensioning means operatively coupled to said web; and means for applying said tension value signal to said electrical-mechanical tensioning means for regulating the tension on the web in response to said coefficient of elasticity.

4,004,511

PRINTING APPARATUS

Jacobus Henricus de Groot, Noordwijkerhout, Netherlands, assignor to B.V. Korthofah, Rijnsburg, Netherlands

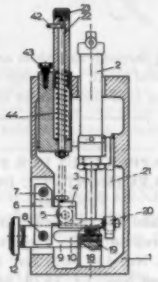
Filed Nov. 18, 1975, Ser. No. 633,163

Claims priority, application Netherlands, Nov. 25, 1974, 7415324

Int. Cl.² B41K *1/42*

U.S. Cl. 101—334 **7 Claims**

1. A printing apparatus for applying markings to a plurality of moving articles, said apparatus comprising a housing, a driving rod mounted for reciprocable movement within said housing, a stamp having opposite ends and including a holder having a longitudinal slot at one of said ends, a printing head at the other end of said holder and at least one spring connecting said printing head with said holder, said printing head having an end face, coupling means for coupling said stamp with said driving rod including a cross-piece fixedly attached to said driving rod, a T-shaped link including a leg and a cross-beam, said link being pivotally suspended from a fixed point of said housing at one end of said cross-beam and being pivotally connected with said holder in the vicinity of said printing head at the other end of said cross-beam while being pivotally connected with said cross-piece at the end of said leg, and a roller fixedly arranged in said housing and engaged in said slot such that said stamp can be displaced by reciprocating movement of said driving rod between a rest position, and an operating position at right angles with said rest position, an abutment in the path of said driving rod for interrupting the downward movement of said rod before said printing head has reached an article to be imprinted, whereby outward movement of said holder due to the rotation of said link around said fixed point is likewise interrupted, so that said printing head advances by its kinetic energy to strike the article and subsequently be retracted by said spring, an ink pad constituted by a rigid porous synthetic material positioned to engage said printing head in the rest position of said stamp, an ink container, a bearing ring attached to said ink container and having an inwardly directed flange retaining said ink pad against the bottom of said ink container, and a resilient ring mounted in the end face of said printing head so as to protrude from the same and be compressed and tightly engage the flange of said bearing ring in the rest position of said stamp, whereby a suction is exerted when said stamp is displaced to the operating position to draw the ink from said ink container into said ink pad.



4,004,512

SHEET TRANSFER DRUM FOR PRINTING PRESSES

Willi Jeschke, Heidelberg, Germany, assignor to Heidelberger Druckmaschinen Aktiengesellschaft, Heidelberg, Germany

Filed Nov. 13, 1975, Ser. No. 631,678

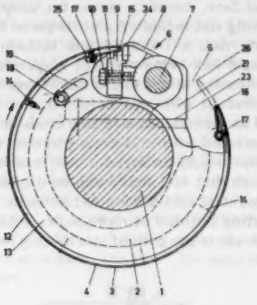
Claims priority, application Germany, May 10, 1975, 7515047[U]

Int. Cl.² B41F *1/30*

U.S. Cl. 101—410 **3 Claims**

1. Sheet transfer drum for a printing press comprising a shaft, a drum body fixed to said shaft, said drum body comprising a tube segment having two ends and two longitudinal edges and respective guide rings fixed to both ends of said tube segment, said longitudinal edges of said tube segment defining a gap therebetween, a gripper assembly received in said gap and comprising, a row of grippers, gripper shaft means for carrying said row of grippers affixed thereto, and a vertically adjustable gripper bearing bar cooperating with said row of grippers for gripping a sheet to be transferred by the sheet transfer drum, bearing means received in said gap for securing said gripper assembly to said shaft, and said guide

rings being formed with respective slots extending in peripheral direction of said drum body, and threaded fasteners re-



spectively extending through said slots and releasably securing said guide rings to said shaft, said guide rings being swingably adjustable relative to said shaft within the range of said slots.

4,004,513

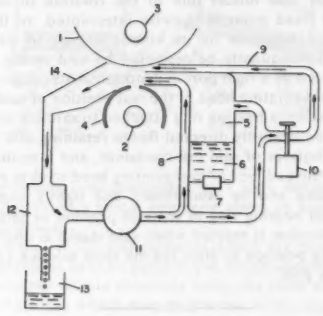
METHOD AND APPARATUS FOR PREVENTING INK SMEARS IN AN ELECTROSTATIC INK MIST PRINTING SYSTEM

Akinori Watanabe, and Takao Ando, both of Takasaki, Japan, assignors to Electroprint, Inc., Cupertino, Calif.

Continuation of Ser. No. 435,562, Jan. 22, 1974, abandoned. This application Nov. 13, 1975, Ser. No. 631,548

Int. Cl.² B41C *1/14*

U.S. Cl. 101—426 **5 Claims**



1. In a method of printing on a recording medium utilizing a mist of liquid ink particles which are charged by ions and accelerated toward and onto the recording medium by an electrical field, the improvement comprising the step of:

selectively forming a layer of the air forwardly of, and parallel and adjacent to, the recording medium in response to the completion of the printing operation to prevent the ink mist from adhering to the recording medium while printing is not occurring.

4,004,514

ROLL RATE STABILIZED WRAP AROUND MISSILE FINS

Peter Daniels, Fredericksburg, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

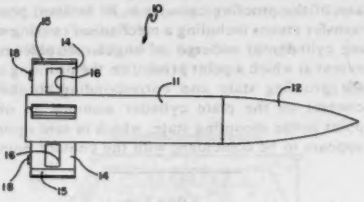
Filed Jan. 20, 1976, Ser. No. 650,639

Int. Cl.² F42B *13/32*

U.S. Cl. 102—3 **4 Claims**

1. An air dropped weapon having a warhead, tail-mounted, wrap-around fins and means for stowing and deploying the fins wherein the improvement comprises:

a fence mounted on the convex side of each fin adjacent the outer extremity thereof for balancing differential drag caused by the asymmetrical roll configuration; and



a slot provided in each fin to cause each fin to change vortices at high angles of attack whereby roll-rate stabilization is obtained.

4,004,515

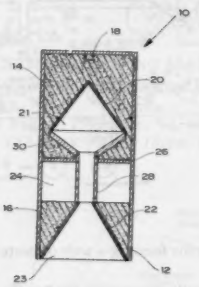
SEQUENTIAL JET SHAPED CHARGE

Herbert D. Mallory, China Lake, Calif., and Frank R. Marquardt, Fairfax, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 25, 1971, Ser. No. 109,543

Int. Cl.² F42B *3/08, 13/10*

U.S. Cl. 102—24 HC **3 Claims**



1. An explosive assembly comprising:

an elongated housing having a longitudinal axis of symmetry, an initiation end, and a terminal end;

a first shaped explosive charge supported in the initiation end of said housing and having an opening therein;

at least one additional shaped explosive charge supported in the terminal end of said housing and having an opening therethrough;

said first and additional charges being spaced apart in said housing so that a torroidal air space exists therebetween;

each said opening and space having an axis of symmetry coincident with said longitudinal axis of symmetry;

a hollow tube connecting said openings through said space; and

a torroidal metal transfer plate fastened in said assembly adjacent the base of said first charge for transferring detonation between said first and said additional charge.

4,004,516

FUZE

Clifford T. Johnson; Melvin J. McCubbin, and Thomas R. Zulkoski, all of Ridgecrest, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 24, 1975, Ser. No. 625,449

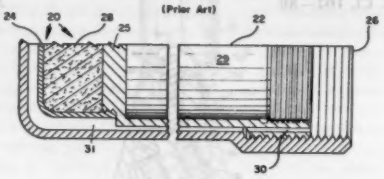
Int. Cl.² F42B *1/00*

U.S. Cl. 102—24 R **2 Claims**

1. In a booster-fuze combination wherein a booster and fuze are fastened together as a unit and inserted in a housing contained within a warhead, the improvement comprising:

said fuze being contained within a metal container having a threaded shoulder for attachment within a threaded housing and a lesser diameter threaded end portion receiving a booster cup;

an explosive booster material in said cup having a predetermined self-detonation temperature;



said booster cup being manufactured of a material which will soften and melt before the self-detonation temperature of the booster; and

a plurality of through holes bored longitudinally through said fuze container shoulder.

4,004,517

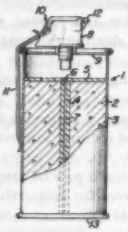
PYROTECHNIC MUNITION AND PROCESS

Melvin N. Gerber, Randallstown; Robert T. Cannon, Churchville, and Mitchell E. Penn, Randallstown, all of Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 2, 1975, Ser. No. 538,298

Int. Cl.² F42B *27/06*

U.S. Cl. 102—65 **4 Claims**



1. A munition of the pyrotechnic type comprising: a canister for containing a smoke payload; a formed smoke payload therein comprising 37 wt per cent granulated dye, 23 wt per cent potassiumchlorate, 2 wt per cent ethylene bis (isothiosemicarbazide), 16 wt per cent polyamide resin; 11.4 wt per cent plasticizer sanitisizer and 10.6 wt per cent thioexpoxy resin, a disposable payload forming mandrel; and a dispensing head.

4,004,518

SELF-FORGING FRAGMENTATION DEVICE

Lester A. Potteiger; William G. Soper, and James C. Talley, all of Dahlgren, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 21, 1965, Ser. No. 465,804

Int. Cl.² F42B *13/48*

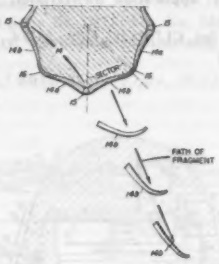
U.S. Cl. 102—67 **7 Claims**

1. In a fragmentation-type ordnance device of a character including a thin-walled substantially polyhedral casing from which a single fragment is produced from each of the lateral faces of said casing, the improvement which comprises

a first means including an explosive charge;

a second means for initially severing said casing along a first series of alternate lateral edges and subsequently severing said casing along the remaining alternate lateral edges;

acceleration said second means further imparting an accelerating force to the casing fragments thereby created to produce a greater acceleratin of the subsequently



severed edges than that of said first series of edges, whereby a plurality of ribbon-like fragments are produced and wherein the leading edge of each of said fragments is one of said remaining alternate lateral edges.

4,004,519

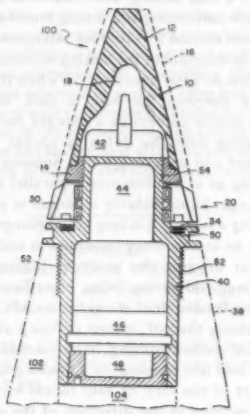
PROJECTILE POWER GENERATOR

Wayne J. Hopkins, College Park, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 12, 1976, Ser. No. 676,018

Int. Cl.² F42C *11/04*

U.S. Cl. 102—70.2 G **6 Claims**



1. In combination with a projectile, a fuse comprising:

a substantially cylindrical housing having one end adapted for fitment within the projectile;

a streamlined nose portion mounted on the other end of the housing, said nose having an internal chamber;

target detection and signal processing means; and

an electrical power generator for said fuse comprising: a wind driven annulus encircling the housing and rotable about the projectiles' longitudinal axis; a plurality of fins disposed around the circumferential surface of the annulus, the surface providing a smooth continuation between the nose portion and the projectile surface to expose the fins to the passing airstream; means to rotatably attach the annulus to the housing; magnetic means disposed on the annulus; and a stator disposed within an annular groove in the housing, said stator separated from the rotor element.

4,004,520

TIME FUSE

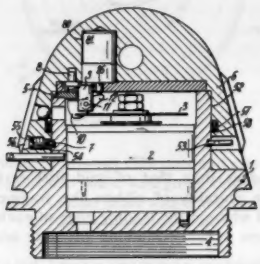
Markus Lenherr, Geneva, and Pierre Iseli, Petit-Lancy, both of Switzerland, assignors to Mefina S.A., Fribourg, Switzerland

Filed Mar. 28, 1974, Ser. No. 456,195

Claims priority, application Switzerland, Apr. 10, 1973, 5107/73

Int. Cl.[2] F42C *1/04, 15/24*

U.S. Cl. 102—78 1 Claim



1. In a time fuse suitable for a non-spinning projectile comprising a fuse body, a fuse setting member movable angularly with respect to the fuse body, a spindle subjected to the torque of a clockwork drive spring adapted to be wound by the setting member, a fuse setting disc rotationally rigid with said spindle, a catch connecting the setting member and the setting disc, and means carried by said fuse setting member for acting on the catch to disconnect the setting member and the setting disc in response to axial acceleration when the fuse is set and the projectile carrying the fuse is shot, the improvement wherein said means comprises a plunger including an extension cooperating with the catch, a socket mounted in the setting member and including a first housing, said socket and housing having an axis substantially parallel to the axis of the fuse, said plunger being slidably mounted in said first housing, means defining a second housing in the plunger coaxial to said first housing, an inertia block mounted in said second housing for movement towards the catch, a biasing spring in said second housing, said spring being of sufficient force to normally urge said inertia block away from said catch and prevent accidental release thereof, means defining at least one radial opening in said second housing, means defining a recess in the inner face of said first housing, said opening facing said recess, at least a part of the face of said recess located nearest the catch being inclined in the direction of the catch, a movable part held by the inertia block in said radial opening of said second housing and in said recess in the inner face of said first housing to lock the plunger relative to the setting member as long as the inertia block is not displaced against the action of said biasing spring by an axial acceleration of the projectile, said movable part comprising a projection on a spring in the form of a split ring, said spring held under tension by said inertia block to engage said projection in said radial opening of said second housing and in said recess in the inner face of said first housing, whereby upon such axial acceleration of the projectile, the resulting inertia causes said inertia block to overcome the force of said spring and slide rearwardly in the housing freeing said movable part from said recess and carrying said movable part and said plunger rearwardly with it causing the extension of said plunger to actuate catch (**10**) to disconnect said setting member and said setting disc and lock said inertia block in its retracted position in said plunger.

4,004,521

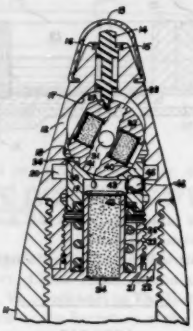
PROJECTILE FUZE

Richard S. Andrejkovics, Philadelphia, Pa., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 1, 1976, Ser. No. 672,581

Int. Cl.[2] F42C *1/04, 9/16*

U.S. Cl. 102—80 3 Claims



1. In a point detonating spin stabilized projectile having a fuze ogive secured in a forward portion of said projectile, a firing pin longitudinally mounted in a central forwardmost passage of said ogive, an explosive booster holder carrying a central booster charge and secured in a rearward portion of said ogive, and a rotor carrying a detonator and a plurality of peripheral rotor detent balls for rotatably mounting said rotor in said ogive intermediate said holder and said ogive passage,

a tubular rotor support slidably mounted in said ogive intermediate said rotor and holder, said support carrying a plurality of self destruct detent balls in its peripheral surface,

a compression spring carried by said holder and forwardly biasing said support,

an expandable detent positioned between said rotor and rotor support and locking said rotor in an unarmed position,

said fuze ogive having a pair of longitudinally spaced internal annular grooves for respectively receiving said rotor detent balls and self destruct detent balls upon launching and flight of said projectile, and a third ogive annular groove intermediate said spaced pair of annular grooves for reception of said expandable detent when the projectile attains predetermined rates of spin.

4,004,522

SHOT SHELL WADDING

Harry Furniss, Oldham, and Jack Grindrod, Royton, Oldham, both of England, assignors to Unit Wad Limited, Werneth, Oldham, England

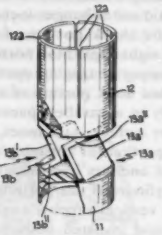
Filed Sept. 26, 1974, Ser. No. 509,690

Int. Cl.[2] F42B *7/08*

U.S. Cl. 102—95 8 Claims

1. A shot/shell wadding having a charge containing cup, a shot-containing cup and a collapsible connection means between such cups, characterised in that the said connection means comprises a plurality of elements each extending between the said cups and each positioned for surface engagement with a respective adjacent element of the said plurality

of elements upon initial collapse of the connection means to provide an increasing frictional resistance to relative motion



therebetween and a consequential increasing resistance to continuing collapse.

4,004,523

SOLID PROPELLANT CHARGES

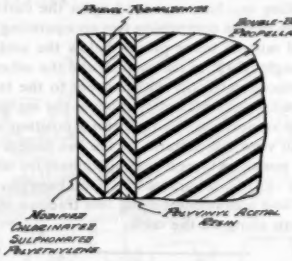
David Victor Clifford; Stephen William Bell, both c/o The Ministry of Aviation, London; Stuart Gordon, 10 Furlongs Road, Cleobury Mortimer, Shropshire, and Philip Graham Jones, 5 Rozel Avenue, Broadwater, Kidderminster, Worcestershire, all of England

Filed Oct. 26, 1966, Ser. No. 591,036

Claims priority, application United Kingdom, Oct. 27, 1965, 45505/65

Int. Cl.² C06B 45/28

U.S. Cl. 102—103 5 Claims



1. A combustion-inhibited solid propellant charge comprising: a solid mass of double-base propellant comprising a mixture of nitrocellulose and a liquid nitric ester, the solid mass of double-base propellant having at least one surface at which combustion is to be inhibited; a layer of a polyvinyl acetal resin bonded directly to said surface; an elastomeric combustion-inhibiting material bonded to the layer of polyvinyl acetal resin; and a layer of another resin which is compatible with the polyvinyl acetal resin and with the elastomeric combustion-inhibiting material, said other layer being selected from the group of resins consisting of epoxy resins, polyesters and formaldehyde resins and being bonded between the layer of a polyvinyl acetal resin and the elastomeric combustion-inhibiting material.

4,004,524

METHOD OF RENEWAL OF A RAILROAD TRACK AND TRAIN THEREFOR

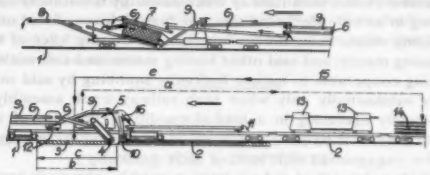
Fredy Scheuchzer, Lausanne, and Fritz Buhler, Ecublens, both of Switzerland, assignors to Les Fils d'Auguste Scheuchzer S.A., Switzerland

Filed June 20, 1975, Ser. No. 588,711

Claims priority, application Switzerland, July 11, 1974, 9596/74

Int. Cl.² E01B 27/02, 27/04, 29/02, 29/05

U.S. Cl. 104—2 9 Claims



4. Apparatus for renewing an old railway track and the bed therefor comprising, a train assembly having:

a. cars for transporting rails, ties and necessary hardware for renewing an old railway track and the bed thereof;

b. at least one track and rail laying lift truck means having gantries;

c. a ballast clearing means for removing ballast of a trackless bed section from which track and ties have been removed and while said train assembly is at a standstill;

d. a screener remote from the trackless bed section for screening the removed ballast to clean it;

e. means for transporting the removed ballast from said clearing means to said screener;

f. means including means for transporting cleaned ballast from said screener and respreading on said trackless bed section for rebuilding it to a desired level including metering means for automatically controlling the volume of cleaned ballast returned to said trackless bed section; and

g. means coactive with said metering means for transporting the remainder of the metered cleaned ballast and delivering it between ties laid on said trackless bed section simultaneously with return of cleaned ballast to said trackless bed section.

4,004,525

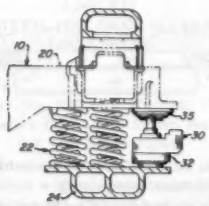
FLUID TRUCK SNUBBER

Donald Wiebe, Sewickley, and John H. Wagner, Bradfordwoods, both of Pa., assignors to A. Stucki Company, Pittsburgh, Pa.

Filed Mar. 28, 1975, Ser. No. 563,147

Int. Cl.² B61F 5/06, 5/12, 5/24, 5/50

U.S. Cl. 105—197 DH 9 Claims



1. In a railway truck snubber assembly adapted to be interposed in a spring group intermediate a bolster member and side frame member of a railway truck assembly, the improvement comprising: a hydraulic snubber having a piston assembly telescopically movable with respect to a snubber casing, along an axis; said piston assembly having one end portion

thereof slidably received within said snubber casing; biasing means received within said casing and operative to bias said piston assembly away from said casing along said axis; other biasing means adapted to be directly interposed intermediate said snubber and one of such members to bias said snubber towards the other of such members; said other biasing means being operationally adapted to have one end portion thereof engage a piston rod of said piston assembly adjacent the other end portion thereof and to have the other end portion of said biasing means directly communicate with the one of such members; said other biasing means being operative to bias said snubber out of operative engagement with the one of such members when such railway truck assembly is normally operating in an unloaded condition; the biasing force of said other biasing means being always less than the biasing force of said biasing means; and said other biasing means and said snubber being cooperable to initiate hydraulic snubbing by said snubber substantially only when such railway truck assembly is normally operating in a loaded condition, the bias of said other means is partially overcome and said snubber is in operative engagement with both of such members.

6. In a dampened railway truck assembly selectively operable in loaded and unloaded conditions and having a hydraulic snubber interposed in the spring group intermediate a bolster member and a side frame member, the improvement comprising: said snubber including a piston assembly telescopically movable with respect to a snubber casing; biasing means received within said casing and operative to bias said piston assembly away from said casing along said axis; other biasing means directly interposed between said snubber and one of said members to bias said snubber towards the other of said members; said other biasing means having one end portion thereof engaging a piston rod of said piston assembly adjacent the other end portion thereof and having the other end portion of said other biasing means communicating directly with said one of said members; said other biasing means being operative to bias said snubber out of operative engagement with said one of said members when said railway truck assembly is normally operating in an unloaded condition; the biasing force of said other biasing means being always less than the biasing force of said biasing means; and said other biasing means and said snubber being cooperable to initiate hydraulic snubbing by said snubber substantially only when said railway truck assembly is normally operating in a loaded condition, the bias of said other means is at least partially overcome and said snubber is in operative engagement with both of said members.

4,004,526

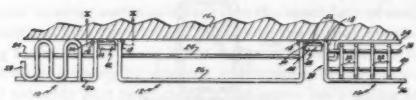
DETACHABLE RACK ANCHOR

Clarence J. King, Ludington, Mich., assignor to Straits Steet & Wire Co., Ludington, Mich.

Filed Dec. 1, 1975, Ser. No. 636,636

Int. Cl.² A47B *3/00*

U.S. Cl. 108—114 **5 Claims**



1. A detachable rack and anchor assembly mountable on a vertical support surface, comprising:

a plurality of anchors adapted to be secured to the vertical support surface in a horizontally spaced relationship, said anchors each having an outer stop portion and an inner shank portion;

a rack including at each end a vertical support engaging portion;

an outer hanger attached to one of such vertical support engaging portions of said rack; and

an inner hanger attached to the outer of said vertical support engaging portions of said rack, said inner hanger and said outer hanger each engaging one of said anchors to thereby detachably mount said rack on said vertical support surface, said outer hanger including a hook portion for engaging said shank portion of one of said anchors and an integral right angled tab portion secured to one of said vertical support engaging portions of said rack so that said inverted hook portion of said outer hanger extends outwardly in a parallel spaced relationship to the vertical support surface, said inner hanger including an inverted hook portion for engaging said shank portion of another of said anchors and an integral cylindrical tab portion, said cylindrical tab portion receiving and being secured to the vertical support engaging portion of said rack, so that said inverted hook portion of said inner hanger engages the vertical support surface.

4,004,527

APPARATUS FOR CORRECTING THE MUTUAL ORIENTATION OF THE PATTERNS ON TWO LAYERS OF CLOTH

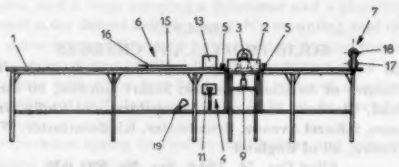
Laurent G. Acker, Bischwiller, France, assignor to Vestra-Union S.A., Paris, France

Filed Jan. 22, 1976, Ser. No. 651,597

Claims priority, application France, Jan. 30, 1975, 75.03638

Int. Cl.² D05B *3/00*

U.S. Cl. 112—121.14 **5 Claims**



1. An apparatus for correcting the mutual orientation of the patterns on two layers of badly-calendered cloth, characterised in that it comprises in combination a table having a central aperture, a carriage with means for moving the carriage to-and-fro on a path transverse to the longitudinal direction of the table, a basting machine mounted upon the carriage, an optical inspection device comprising two co-operating mirrors with one of said mirrors being placed below the said central aperture at an angle of 45° to the vertical and the other of said mirrors being placed vertically with respect to the table surface and facing a laterally-placed opening in the margin of the table at the side opposite to an operator's position whereby the operator can view the patterns of the two layers of cloth and the relative positions thereof, clamping bars for temporarily clamping the cloth, a separator to extend between the two layers of cloth, and means comprising two traction rollers for drawing the cloth along on the table.

4,004,528

HEAT SINK FOR AN APPLIANCE CIRCUIT BOARD

Kenneth Douglas Adams, Madison, and Edward Walter Ostapczuk, Union, both of N.J., assignors to The Singer Company, New York, N.Y.

Filed Mar. 26, 1976, Ser. No. 670,779

Int. Cl.² D05B *71/00*

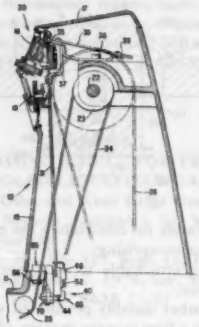
U.S. Cl. 112—218 R **4 Claims**

1. A heat sink arrangement for an appliance having a heat conducting frame with at least one access opening to the interior thereof, and controlled by an electronic assembly including heat dissipating components disposed internally of said frame, the heat sink arrangement comprising:

heat conducting bracket means affixed to said frame of said

appliance for good heat conduction thereof, said bracket means having a first surface and a second surface substantially oppositely disposed to said first surface;

heat conducting heat sink means attached to said electronic assembly and supporting said heat dissipating components for good thermal conductivity but electrically isolated therefrom, said heat sink means having a first surface disposed contiguous and congruent said first surface of said bracket means, said heat sink means having a



second surface substantially oppositely disposed to said first surface of said heat sink means; and,

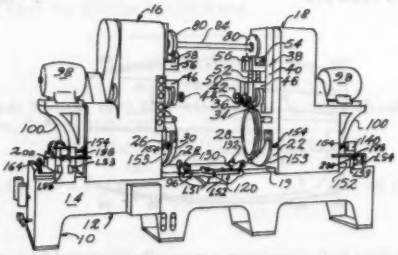
clamping means for pressing said bracket means to said heat sink means for good thermal conductivity and support of said electronic assembly, said clamping means having a portion thereof abutting one of said second surfaces and including a screw thread device in adjustable pressure contact with the other of said second surfaces in opposition to said portion of said clamping means, said screw thread device being accessible from an access opening.

4,004,529

CAN HEAD SEAMING METHOD AND APPARATUS

Eugene R. Grotnes, Atlanta, Ga., assignor to Atlanta Grotnes Machine Company, Atlanta, Ga.

Filed July 14, 1975, Ser. No. 595,673
Int. Cl.² B21D *39/02*
U.S. Cl. 113—58 **26 Claims**



1. In a seaming machine in which there is a base frame having a pair of seaming heads mounted in spaced relationship on said base frame for horizontal operation thereon toward or away from each other, a drum support means on said base and between said heads for supporting a drum and drum head thereon for a seaming operation, means on said frame for driving said heads to close on said respective ends of said drums, respective first and second chuck means on each of said heads for engaging a respective end of said drum and seaming means on said heads engageable with said drum for engaging thereagainst to form a seam between the drum and drum head, the improvement comprising: first and second respective independent drive means for driving a respective one of said respective chucks whereby the said respective first or second drive means drives only one respective chuck and whereby said first drive means is not connected to the second drive means until a drum is in place and then only thru the drum.

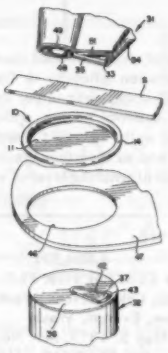
23. In a method for seaming a drum which comprises a cylindrical drum body having open ends which are provided with respective closures in the form of drum heads and which are engaged by seaming means to form seams to attach said drum heads to said drum: supporting said drum for rotation, engaging the opposite ends of said drum with respective support chucks, rotating at least one of said chucks from a drive means to drive said drum independently of said other chuck at least initially to adjust the speed of said drum on both chucks from the drive means.

4,004,530

METHOD FOR MAKING AN EASY OPENING END CLOSURE FOR A CONTAINER

John Walter, Evergreen Park, Ill., assignor to Continental Can Company, Inc., New York, N.Y.

Division of Ser. No. 365,014, May 29, 1973, Pat. No. 3,967,749. This application Dec. 23, 1975, Ser. No. 643,647
Int. Cl.² B21D *51/44*
U.S. Cl. 113—121 C **4 Claims**



1. The method of forming an easy opening end closure in a metal panel comprising the steps of placing a strip of plastic material on said panel, placing said end closure on a blanking punch, appying sufficient force on said plastic to forge the plastic and cause the metal panel to be displaced toward said blanking punch and be severed by said forged plastic to form a slit, and allowing said forged plastic to fill said slit.

4,004,531

DRILLING SYSTEM FOR DEEP WATER OFFSHORE LOCATIONS

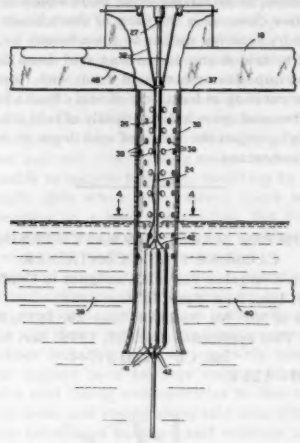
George E. Mott, Metairie, La., assignor to Texaco Inc., New York, N.Y.

Continuation of Ser. No. 470,685, May 16, 1974, abandoned. This application Oct. 3, 1975, Ser. No. 619,346
Int. Cl.² B63B *35/44*
U.S. Cl. 114—256 **11 Claims**

1. The combination with a semisubmersible drilling vessel adapted for operating in an offshore body of water, said vessel having a work deck supported above the water's surface by a plurality of substantially vertically disposed upright columns which are spaced apart to permit passage of water and waves therebetween when said vessel is floatably stationed at an offshore working site, a drill string riser depending from said vessel and extending to the floor of said body of water to accommodate a drill string therethrough, of;

shielding means surrounding the upper end of said drill string riser to protect the latter from contact with waves which pass through said spaced apart support legs, which shielding means comprises;

an elongated open ended caisson depending downwardly from said vessel to a sufficient water depth, and being



spaced outwardly from the said riser to define an annular space therebetween whereby to form a protective zone about said drill string riser upper end,

said elongated caisson having a series of perforations formed in the walls thereof to permit passage of water therethrough and to maintain the water level within said caisson consistent with the level of water external thereto.

4,004,532

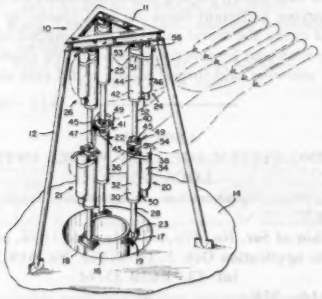
RISER TENSION SYSTEM FOR FLOATING PLATFORM

Thomas J. Reynolds, Lake Stevens, Wash., assignor to Western Gear Corporation, Everett, Wash.

Filed May 5, 1975, Ser. No. 574,378

Int. Cl.² B63B *35/44*

U.S. Cl. 114—256 **23 Claims**



1. In combination;

a floating platform,

a load in the water below said platform,

an active heave compensator system, and

a back-up heave compensator system, one of said systems being supported by said platform and giving support to the other said system, the other said system being operatively connected between the load and the platform supported system.

4,004,533

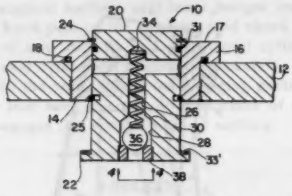
SCUTTLING VALVE

Lionel L. Woolston, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 25, 1976, Ser. No. 689,891

Int. Cl.² B63G *8/22;* **B63B** *21/52;* **F16K** *24/04*

U.S. Cl. 114—16 E **12 Claims**



1. A valve assembly for controlling the entry of fluid into a controlled volume comprising:

a valve housing attachable to a surface defining the controlled volume;

a piston member slidably positioned within said housing and having a flow passage therein, said member in fluid communication with the controlled volume; and

a ball valve within said flow passage and movable between a first, non-sealing position and a second, fluid sealing position,

said piston member responsive to pressure within the controlled volume to move outwardly within said housing to place said flow passage in fluid communication with the ambient environment, and

said ball valve responsive to pressure within the controlled volume to move from said first position to said second position to seal the controlled volume, and returning to said first position upon removal of pressure to permit entry of fluid into the controlled volume.

4,004,534

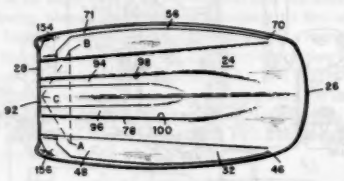
BOAT HULL

Darris E. Allison, Rte. 4, Box 1, Louisville, Tenn. 37777

Filed Nov. 28, 1975, Ser. No. 636,029

Int. Cl.² B63B *1/20*

U.S. Cl. 114—274 **5 Claims**



1. A boat hull comprising a generally elongated body portion including bow means and transom means, first and second elongated sponson means depending from said body portion along the opposite side margins of said body portion and defining elongated running surfaces, said first and second sponson means terminating at their respective aft ends at a location forward of said transom means, but rearwardly of the transverse midplane of said hull, third elongated sponson means depending from said body portion at a location centrally thereof in substantial alignment with the longitudinal centerline of said body portion and defining an elongated running surface that extends beyond the aft terminal ends of said first and second sponson means to the approximate location of said transom means, said first and third sponson means

in combination with said body portion defining a first elongated tunnel means extending along a substantial portion of the length of said body portion in general alignment with said longitudinal centerline of said body portion but displaced laterally thereof, said second and third sponson means in combination with said body portion defining a further elongated tunnel means extending along a substantial portion of the length of said body portion in general alignment with said longitudinal centerline of said body portion but displaced laterally thereof and on the opposite side of said longitudinal centerline as said first tunnel means, each of said first and further tunnel means being open at its respective forward and aft ends for the flow of fluid therealong and reducing in cross-sectional area from the forward end of said hull toward the aft end of said hull.

4,004,535

VESSEL COMPRISING A HULL FOR TRANSPORTING COOLED LIQUEFIELD GAS

Per Jorgen Oiern, Oslo, and Knut Helge Osmundsvaag, Lierbyen, both of Norway, assignors to A/S Akers Mek. Verksted, Oslo, Norway

Continuation of Ser. No. 396,327, Sept. 11, 1973, abandoned. This application June 12, 1975, Ser. No. 586,175

Int. Cl.² B63B *25/08*

U.S. Cl. 114—74 A **8 Claims**

1. A vessel having an upper deck and having at least one container for the transportation of cooled, liquefied gas or the like, comprising: at least one center cargo hold located below the deck of the vessel; said center hold including interconnected longitudinal and transverse bulkheads and a support frame interconnected with said bulkheads and located at a top portion of said center hold, said bulkheads forming side walls of said frame and said support frame having an open top portion; and side tanks extending down from the deck and extending transversely outwardly of said center hold and said frame; said container being supported by said frame and the lower portion of said container extending downwardly within said open top portion of said frame.

4,004,536

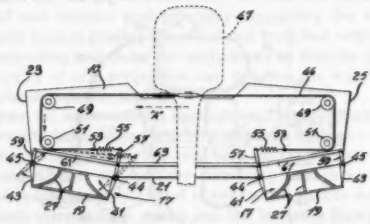
ANTI-SKID BOAT

Claude Bernier, 1203 Boul. Mont-Royal, West Montreal, Quebec, Canada H2V 2H7

Filed Mar. 17, 1975, Ser. No. 559,337

Int. Cl.² B63H *25/08*

U.S. Cl. 114—144 R **40 Claims**



1. A boat having a hull, and means on each side of the hull to reduce the tendency of the boat to drift out during a turn in either direction, the means on the right side of the hull biting into the water and reducing the tendency of the boat to drift out in a direction toward the left side during a turn to the right side and the means on the left side of the hull biting into the water and reducing the tendency of the boat to drift out in a direction toward the right side during a turn to the left side, each said means including: an elongated vane extending substantially longitudinally of said hull; and means for supporting said elongated vane in relatively closely spaced relationship from said hull over a major portion of the length thereof, whereby said vane and said hull form therebetween an elongated, substantially longitudinally extending, relatively narrow slot through which water can flow laterally outwardly from beneath the central portion of the hull during a turn of the boat.

4,004,537

STEERING MECHANISM

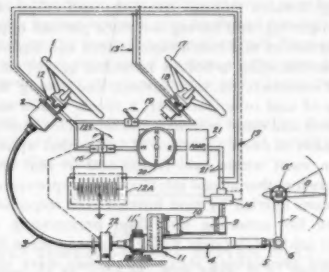
Sven Walter Nilsson, Partille, Sweden, assignor to SKF Nova A.B., Goteborg, Sweden

Filed May 14, 1976, Ser. No. 686,539

Claims priority, application Sweden, May 16, 1975, 7505626

Int. Cl.² B63H *25/20, 25/24*

U.S. Cl. 114—144 R **9 Claims**



1. In a steering system of the class comprising a steering member movable to exert a steering effect, rotatable means responsive to rotation thereof for moving said steering member to produce said steering effect, and manually-operable steering control means for effecting control of the rotation of said rotatable means in response to changes in the position of said steering control means, the improvement comprising:

motor means;

double-acting free-wheeling clutch means;

said clutch means comprising primary drive means, free wheel means, and releasable coupling means for rendering said primary drive means responsive to rotational drive applied thereto in either direction to rotate said free wheel means, and for rendering said free wheel means rotatable substantially free of said primary drive means in either direction with respect to said primary drive means;

means connecting said free wheel means to said manually-operable steering control means and to said rotatable means to provide a direct rotational connection between them; and

means connecting said motor means to said primary drive means to drive it in rotation when said motor means is operating;

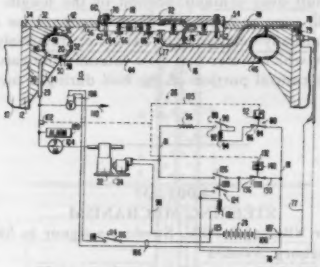
whereby both said motor means and said manually-operable steering control means are drivingly connected to said rotatable means except at times when said free wheel means is rotated with respect to said primary drive means, said steering control means at said times being operable to drive said rotatable means substantially independently of said motor means.

4,004,538

WAVE RESPONSIVE HATCH COVER LOCKING AND SEALING MECHANISM

Marten Leonard Schoonman, 906 N. Elam Ave., Greensboro, N.C. 27408

Filed Mar. 19, 1976, Ser. No. 668,381
Int. Cl.² B63B 19/12
U.S. Cl. 114—201 R 6 Claims



1. In a marine cargo vessel or the like having a deck extending horizontally across the hull of the vessel and defining with the hull at least one cargo storage compartment, a hatchway member within said deck forming a cargo compartment access opening, a hatch member overlying said cargo compartment access opening, and having a surface portion opposing a surface portion of said hatchway member and defining an interface therebetween, a hollow inflatable gasket carried by one of said members on said surface and facing the opposing surface of said other member, a recess within said opposing surface of said other member, and means for fluid pressurizing said gasket to cause a portion of said gasket upon inflation to position itself within said recess and to seal and lock said members together at said interface, the improvement comprising: means carried by said hatch cover responsive to water pressure for actuating said fluid pressurizing means, and wherein said hatch cover water pressure means for operating said fluid pressurizing means comprises wave sensor switch means and said means for fluid pressurizing said gasket comprises a pump, a first conduit fluid connecting said pump to said gasket, a drive motor mechanically coupled to said pump, a voltage source and circuit means connecting said voltage source, said motor and said switch means in series.

4,004,539

MARINE IMPLEMENT

Harry J. Wesson, 237 River St., Manistee, Mich. 49660

Filed Sept. 22, 1975, Ser. No. 616,160
Int. Cl.² B63B 21/04
U.S. Cl. 114—221 R 7 Claims

1. A marine implement including a boat hook having an elongated handle portion extending along a handle axis, a hook portin extending laterally from said axis, and a prod portion extending parallel to said axis on the opposite side of said hook portion from said handle portion, wherein the improvement comprises:

coupling means on said prod portion coaxial therewith, including a threaded portion, said prod portion having a point extending substantially beyond said coupling means; and

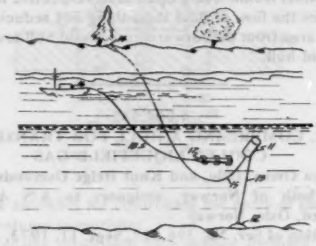
at least one attachment engageable with said coupling means, and having a socket in which part of said prod portion is receivable.

4,004,540

GALVANIC DETECTOR FOR DETECTING THE CUTTING OF A COMMAND WIRE

Francis J. Higgins, Panama City, Fla.; Charles T. McGraw, Atlanta, Ga., and Edward L. Sanderson, Panama City, Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 10, 1968, Ser. No. 698,097
Int. Cl.² G01V 3/02, 9/00
U.S. Cl. 114—244 10 Claims



1. An apparatus for indicating the presence and cutting of an electrical wire located within an aqueous medium in contiguous disposition with the floor thereof, comprising:

a cutting assembly, adapted for being towed by a predetermined tractor vehicle along the floor of said aqueous medium, having at least one sharpened metallic blade and at least one reference electrode of the same metallic material as said sharpened metallic blade disposed within said aqueous medium in close proximity therewith but electrically insulated therefrom;

means connected to said cutting assembly for the towing thereof by said tractor vehicle, said towing means including a plurality of electrical conductors, one of which is electrically connected to said sharpened metallic blade, and another of which is connected to said one reference electrode; and

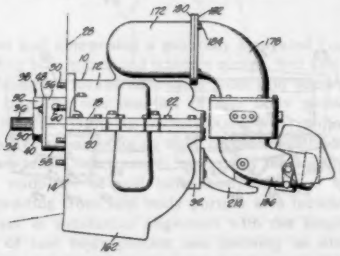
means connected to said electrical conductors for utilizing the pulses of galvanic current which flows between said sharpened metallic blade and the aforesaid one reference electrode and within said electrical conductors as a result of the contact of said sharpened metallic blade with the aforesaid electrical wire.

4,004,541

JET BOAT PUMP

Hasan F. Onal, Denver, Colo., assignor to Hydro-Tech Corporation, Denver, Colo.

Continuation of Ser. No. 382,374, July 25, 1973, abandoned.
This application July 28, 1975, Ser. No. 599,535
Int. Cl.² B63H 11/04, 11/10
U.S. Cl. 115—12 R 11 Claims



1. A pump for propelling a boat, comprising

a pump housing having inlet passage means for receiving water and outlet passage means for discharging water;

a pump shaft rotatably mounted in said pump housing; and

an impeller mounted concentrically on said pump shaft in said housing, said impeller being in communication with said inlet passage means and said outlet passage means;

said outlet passage means including an outlet channel, a nozzle operably joined with said outlet channel to allow rotation of said nozzle about a substantially vertical axis and about a substantially horizontal axis perpendicular to the center line of the boat, and support means comprising a support bracket mounted on said housing and having a track extending in a front to rear direction, a ball positioned in said track, and a socket on the nozzle holding said ball.

4,004,542

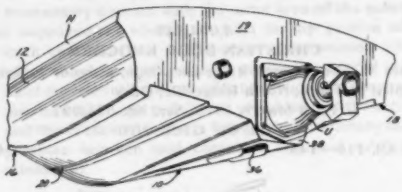
WATERJET PROPELLED PLANING HULL

William H. Holmes, 931 Sunset Drive, Costa Mesa, Calif. 92627

Continuation-in-part of Ser. No. 341,886, March 16, 1973, abandoned. This application June 3, 1975, Ser. No. 583,283

Int. Cl.² B63H *11/02*

U.S. Cl. 115—14 **3 Claims**



1. A planing boat hull for use with a waterjet propulsion unit having a downwardly-facing water intake and a rearwardly directed discharge nozzle, said boat hull comprising:

a generally flat V-shaped bottom;

a depending support pod extending forwardly from the transom of said hull, said support pod having a flat underside and a pair of upwardly extending sidewalls, said support pod receiving the lower portion of said waterjet propulsion unit, with the water intake of said unit being provided at the underside of said support pod;

a pair of depending stabilizing strakes extending longitudinally along the major length of said hull from the transom thereof, with the inwardly-facing side surfaces of said strakes being substantially vertically extending so as to provide lateral resistance against sideward movement of said hull during forward travel thereof, the flat underside of said support pod primarily supporting the weight of said boat at planing speeds of said boat, but with said pod extending into the water sufficiently so that the discharge nozzle of said propulsion unit is below the water level at planing speeds; and

a pair of intermediate depending strakes which extend longitudinally along said bottom of the hull, said intermediate strakes being disposed between the opposite sides of said support pod and the stabilizing strakes whereby an air cushion is generated between the spaces separating each intermediate strake and the inwardly facing side of the stabilizing strake proximate thereto, and with the outer sides of said intermediate strakes being generally vertically extending so as to provide additional lateral resistance against sideward movement of said hull during forward travel thereof.

4,004,543

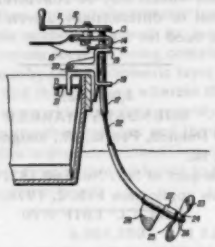
MANUALLY OPERATED PROPELLING APPARATUS FOR A BOAT

Zesely B. T. Cox, Redmond Road, Rome, Ga. 30161

Filed Mar. 4, 1975, Ser. No. 555,120

Int. Cl.² B63H *16/14*

U.S. Cl. 115—24 **15 Claims**



1. A manually operated propelling apparatus for a boat comprising:

a. a clamp for attaching the propelling apparatus to the transom of a boat;

b. a propeller shaft housing attached to said clamp;

c. a sun gear driving arrangement, wherein the interior member is the driven gear and the exterior member is the drive gear having internal gear teeth and having a flange which covers the internal gear teeth of said drive gear and which covers a substantial portion of the gear teeth of said driven gear, attached to one end of said propeller shaft housing; and

d. a flexible propeller shaft within said propeller shaft housing attached to said sun gear arrangement at one end and to a propeller at the other end.

4,004,544

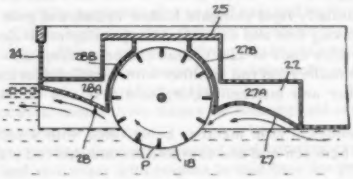
TWIN TURBINE-WHEEL DRIVEN BOAT

John J. Moore, 44 W. 77th St., New York, N.Y. 10024

Filed Dec. 24, 1975, Ser. No. 644,057

Int. Cl.² B63H *5/04*

U.S. Cl. 115—50 **10 Claims**



1. A rudderless motorboat comprising:

A. a hull having a stern board, a keel and a pair of longitudinally-extending tunnels indented in the bottom of the hull and symmetrically disposed in the stern section of the hull with respect to the keel and extending through the stern board;

B. a turbine wheel rotatably mounted in each of said tunnels at a position intermediate the inlet and outlet thereof, only the lower segment of each wheel projecting below the bottom of the hull, said wheels functioning to propel the boat and also functioning as traction wheels to carry the boat over submerged bodies to prevent it from running aground, each wheel being formed by a pair of discs and circumferentially arranged paddle blades bridging said discs;

C. inlet and outlet baffle means disposed within each tunnel

on the inlet side and outlet side of the wheel and contoured to admit water passing through the longitudinally-extending tunnel to the propelling segment of the wheel and to discharge water therefrom toward the stern board; the baffle means otherwise conforming to the periphery of the wheel to prevent recirculation of the water;

D. an inboard engine; and

E. means operatively coupling said engine to said wheels whereby said wheels may be concurrently driven to propel said boat or differentially driven to steer said boat without the need for a rudder.

4,004,545

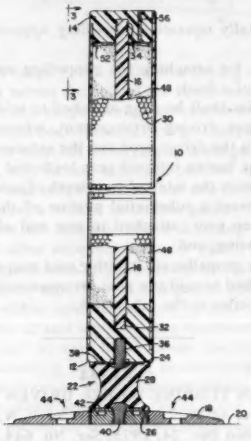
BOUNDARY MARKER

John Francis O'Donnell, Peoria, Ill., assignor to G.L.P. Company, Peoria, Ill.

Continuation-in-part of Ser. No. 560,187, March 20, 1975, abandoned. This application Feb. 2, 1976, Ser. No. 654,161

Int. Cl.² E01F *9/10*

U.S. Cl. 116—63 P **15 Claims**



1. A boundary marker, comprising

a base member adapted to be attached to a fixed support surface,

a substantially rigid elongate hollow cylindrical pole member having first and second end caps adapted to close the respective ends of said cylindrical pole member,

a substantially rigid rod member within said cylindrical pole member and interconnecting said first and second end caps,

said cylindrical pole member being filled with a solidified foam between said end caps and around said rod member, and

a solid unitary flexible support member interconnecting said base member and said first end cap.

4,004,546

ILLUMINATED INDICATOR GAUGE

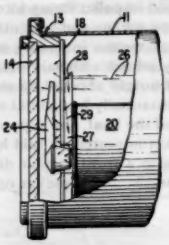
Philip W. Harland, Perkasie, Pa., assignor to Ametek, Inc., New York, N.Y.

Filed May 2, 1975, Ser. No. 573,920

Int. Cl.² G01D *13/04, 13/22*

U.S. Cl. 116—129 L **6 Claims**

1. In an illuminated indicator instrument, the combination of a casing having an open end closed by a viewing window, a translucent dial spaced inwardly of said window, said dial having indicia thereon, a movement within said casing inwardly of said dial and a pointer between said dial and window operatively connected to said movement, a light source within said casing toward the rear thereof and laterally of said movement, and a light conducting prism between said movement and said dial having a beveled surface at an upper edge thereof spaced from the edge of said dial to receive light directly from



said light source, said beveled surface reflecting light transversely therethrough by said beveled surface and a portion of said dial receiving light directly from said source and passing light directly therethrough to illuminate the pointer and dial.

4,004,547

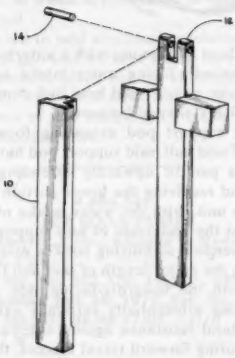
CHRISTIAN DOOR KNOCKER

James M. Todd, North Ridgeville, Ohio, assignor to Reigning Spirit of Truth, North Ridgeville, Ohio

Filed May 9, 1975, Ser. No. 576,097

Int. Cl.² G10K *1/10*

U.S. Cl. 116—148 **1 Claim**



1. A door knocker comprising: (a) an elongated base for mounting on the outer surface of a door said base consisting of a transverse piece having an outer surface and a recessed portion and an upright piece having a back face abutting the outer surface of the door, a front face and a top; and (b) a knocker element having a knocking surface and an outer surface, said knocker element being disposed longitudinally coextensive to the front face of the upright piece and having one end connected to the top half of the upright piece for swinging movement of the knocker element toward and away from the upright piece of the base and within the recessed portion of the transverse piece to strike the front face of the upright piece with the knocking surface, wherein the outer surface of the transverse piece and the outer surface of the knocking element are in the same plane.

4,004,548

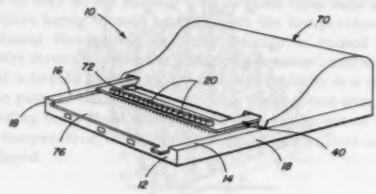
CHROMATOGRAPHIC SPOTTER

Frank M. Smola, and Henri E. Breton, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 592,704, July 2, 1975, abandoned. This application Sept. 15, 1975, Ser. No. 613,382

Int. Cl.² B05C *1/02*

U.S. Cl. 118—58 **13 Claims**



1. In an apparatus for simultaneously applying a plurality of small spots of solution to a substrate, the apparatus including

supporting means for supporting the substrate in a generally planar orientation, a plurality of containers each having a reservoir portion and a tip portion provided with a capillary exit passage fluidly connected to the reservoir portion,

a mounting member having a plurality of apertures, each of said containers being mounted in one of said apertures,

and means for repeatedly moving said tip portions into momentary contact with the same area of the substrate;

the improvement wherein at least the tip portion of said each container and said member are mounted with respect to each other so as to permit substantial relative axial movement between said tip portion and the member aperture when the member is urged toward the substrate and the container contacts the substrate, whereby contact pressure between said container and said substrate is minimized.

4,004,549

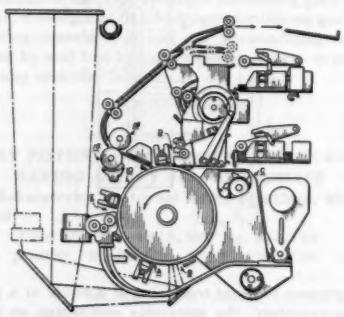
ROLL FUSER

Miles Davis, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 10, 1975, Ser. No. 630,378

Int. Cl.² B05C *11/00*

U.S. Cl. 118—60 **6 Claims**



1. Roll fuser apparatus for fixing toner images to support material including a heated fuser structure and a resilient backup member cooperating with said heated fuser structure to form a nip through which said support material passes with the toner images carried thereby contacting the heated fuser structure wherein:

said heated fuser structure comprises a rigid conductive core;

an elastomeric layer affixed to the outer surface of said rigid core and impregnated with release agent material;

means disposed internally of said rigid core for elevating the temperature of the surface of said elastomeric layer to a degree sufficient for softening toner of said toner images; and

said rigid core having a non-uniform cross section adjacent its outer surface and said elastomeric layer having a non-uniform cross section adjacent its inner surface, said non-uniform cross sections being complementary one to the other whereby said elastomeric layer comprises alternately thick and thin portions wherein the thick portions are adapted to provide a greater quantity of release agent material than the thin portions and the thin portions are sufficiently thin to provide minimal impedance to thermal energy flowing from within said core to the outer surface of said elastomeric layer.

4,004,550

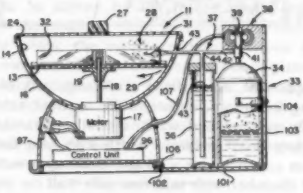
APPARATUS FOR PREPARING MICROSCOPE SLIDES

Ronald D. White, 6466 Saipan St., Cypress, Calif. 90630, and John F. Gibson, 543 Cerritos Ave., Long Beach, Calif. 90802

Continuation of Ser. No. 419,947, Nov. 29, 1973, abandoned. This application Apr. 4, 1975, Ser. No. 565,149

Int. Cl.² B05C *11/10, 5/00*

U.S. Cl. 118—314 **5 Claims**



1. An apparatus for automatically preparing microscope slides having blood smear specimens or the like on a face thereof comprising:

a base;

rotatable slide carrier means rotatably mounted on an axis on said base and including a planar support surface substantially perpendicular to said axis and having a plurality of slide holder means thereon for receiving and removably holding a corresponding plurality of specimen slides in which the faces thereof are substantially perpendicular to the planar support surface;

electrical motor drive means for rotating said carrier means relative to said base;

spray means disposed adjacent said rotating carrier means and stationary with respect to said base for producing an atomized spray of a slide preparation solution in the proximity of the rotating slides to cause the atomized solution to be deposited on the faces of the slides over the specimen when the slide is brought into register with the spray means, said spray means including a spray nozzle having a spray axis positioned relative to said carrier means such that the nozzle axis lies in a plane substantially parallel to the plane of the support surface and that the portion of the spray pattern produced by the nozzle which lies within the parallel plane of the nozzle is located within the lateral confines of the slide which intercepts the spray pattern, said nozzle forming a time varying acute angle with the slide brought into register therewith so that said spray moves across the face of the slide during the movement of the latter;

electrically operated spray actuator means associated with said spray means for selective actuation thereof to produce said spray; and

electrical control means including a timing means connected to said motor drive means and to said spray actuator means for selective timed energization thereof including a timed spray mode in which said motor drive means and said spray actuator means are jointly energized and a timed drying mode in which only said motor drive means is energized.

4,004,551

BREEDING AQUARIUM HAVING FILTERING CHAMBER THEREIN

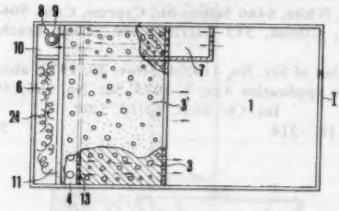
Yukio Kato, No. 2-1, Hanegi 2-chome, Setagaya, Tokyo, Japan

Filed May 23, 1975, Ser. No. 580,142

Claims priority, application Japan, Jan. 30, 1975, 50-12979; Jan. 30, 1975, 50-12978; Jan. 30, 1975, 50-12977

Int. Cl.[2] A01K *63/00*

U.S. Cl. 119—5 9 Claims



1. An aquarium, comprising a rectangularly block shaped tank having a bottom, substantially vertical side walls and substantially vertical end walls, a first substantially vertical partition plate coextensive in width with said end walls and spaced from said one side wall and defining a vertically elongated feed chamber with said one side wall on one side, said tank defining a breeder chamber on the opposite side of said partition plate from said one side wall, a second angled substantially vertical perforated second partition plate disposed alongside said first partition plate in said breeder chamber and having a first wall portion much shorter than and spaced away from said first partition plate and a second top portion extending from the top of said first wall portion to said first partition plate and enclosing an open spaced chamber between said second partition plate and said first partition plate, at least one third partition plate having openings therethrough and being coextensive in width with said end walls and spaced from said second partition plate in the direction of the opposite one of said side walls and being much shorter in height than said first partition plate and defining a filtering chamber at least partly overlying said second top portion and partly extending laterally of said first wall portion, a filtering material in said filtering chamber, a water lift tube disposed in said feed and having a bottom opening spaced upwardly from the bottom of said tank and a top opening spaced downwardly from the top of said tank, a fluid blast tube connected from the exterior of said tank into the lower portion of said lift tube and providing a blast of fluid into said tube whereby to produce an upward flow therein and the discharge of liquid at the top of said lift tube into said feed chamber, said feed chamber communicating adjacent its lower end with said free spaced chamber so that the increased head in said feed space produced by said blast tube causes a flow into said free space and upwardly and horizontally through said filtering chamber and through the openings in said third partition plate in accordance with the resistance of the filtering material in said filtering chamber, and means defining a reflex flow path adjacent the bottom of said tank for flow of liquid from said breeding chamber, through said filtering chamber and into said feed chamber adjacent the lower end thereof.

4,004,552

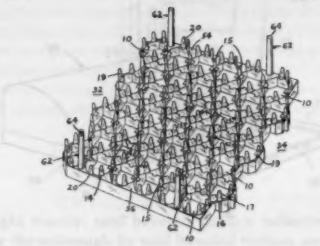
EGG INCUBATING TRAY WITH RACK AND SLIDE

Gerd Levin, Ernst August Str. 13A, Hamburg 52, Germany

Continuation-in-part of Ser. No. 480,294, June 17, 1974, abandoned. This application June 9, 1975, Ser. No. 584,739

Int. Cl.[2] A01K *41/00*

U.S. Cl. 119—43 30 Claims



1. An egg incubating tray comprising:

means defining a plurality of parallel rows of egg cells, said rows being positioned to longitudinally offset the cells in alternate rows by substantially half the length of a cell from the cells in other proximate rows,

an extremost egg cell in said alternate rows projecting by substantially half the length of a cell beyond the extremost cell in the other proximate rows to define a jagged edge of said tray,

said jagged edge defined such that a second egg incubating tray having a jagged edge interfits with said egg incubating tray with the extremost egg cells in said alternate rows fitting between extremost projecting egg cells in said second egg incubating tray and the extremost projecting egg cells in said second egg incubating tray fitting between the extremost egg cells in said alternate rows.

4,004,553

HEAT TREATING APPARATUS FOR LIQUIDS

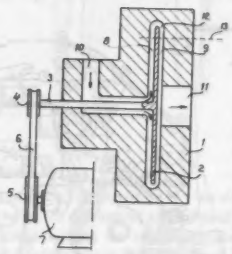
Lennart Arvid Stenstrom, Huddinge, Sweden, assignor to Alfa-Laval AB, Tumba, Sweden

Filed Mar. 19, 1975, Ser. No. 559,664

Claims priority, application Sweden, Mar. 25, 1974, 74039637

Int. Cl.[2] F22B *3/06*

U.S. Cl. 122—26 20 Claims



1. Apparatus for heat treatment of a liquid at a predetermined temperature, the apparatus comprising at least two members and driving means for rotating at least one of the members relative to the other around a rotational axis, said members forming between them a narrow passage extending around the rotational axis and serving for through-flow of said liquid, said driving means being operable to effect relative movement between the walls defining the narrow passage, whereby liquid flowing through the passage is heated by inter-

nal friction in the liquid, said passage, as viewed in a section along the rotation axis, having a liquid inlet spaced from said axis and extending from said inlet, via a point spaced a greater distance from said axis than is said inlet, to a liquid outlet located closer to said axis than is said point, the apparatus being characterized in that one of said members is heat conducting and operable to transfer heat from liquid situated in the passage, and which has passed the passage part farthest from said axis, to liquid also situated in the passage but which is on its way to the passage part farthest from said axis, said members being formed so that most the temperature rise of the liquid flowing through said passage is caused by heat transfer through said heat conducting member, and so that the liquid is heated by internal friction substantially in a small part of the passage located farthest from the rotation axis, thereby providing for a rapid and uniform heat treatment of liquid at high temperature, including heating and subsequent cooling of the liquid.

4,004,554

FUEL CONVERTING METHOD AND APPARATUS

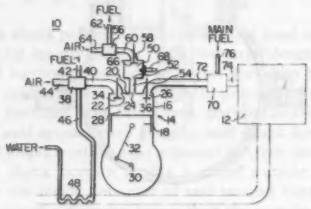
Katuaki Kosaka, Tokyo; Zene Ueno, Fuchu, and Tadahiko Nagaoka, Tokorozawa, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Feb. 20, 1975, Ser. No. 551,382

Claims priority, application Japan, Feb. 26, 1974, 49-22677

Int. Cl.² F02B *43/08*

U.S. Cl. 123—3 **11 Claims**



1. A method of converting a fuel into a free hydrogen containing gas, comprising the steps of filling a first space with a base mixture of fuel, oxidant and water having a predetermined ratio to each other, compressing said base mixture, filling separately a second space with a combustible mixture of fuel and oxidant having a predetermined ratio to each other, igniting said combustible mixture to produce a flame, spurting said flame into said compressed base mixture, causing conversion of said base mixture into a free hydrogen containing gas and expansion of said free hydrogen containing gas by heat of said flame, making said free hydrogen containing gas perform work during expansion of said gas, accumulating said work performed by said free hydrogen containing gas as power for compressing said base mixture.

4,004,555

ROTARY PISTON INTERNAL COMBUSTION ENGINE HAVING A HEAT TRANSFER PHASE

Dragan Bukatarevic, 75, Lionel Road, Brentford, Middlesex, England

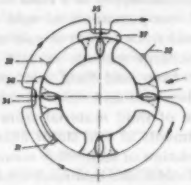
Filed Mar. 17, 1975, Ser. No. 558,739

Claims priority, application Yugoslavia, Apr. 1, 1974, 898/74

Int. Cl.² F02B *53/00*

U.S. Cl. 123—8.05 **6 Claims**

1. A rotary internal combustion engine comprising an annular cylinder; two co-axial rotors; at least three equi-spaced pistons carried by each rotor and alternately disposed in the cylinder; inlet means, exhaust means and ignition means; rotor constraining means for constraining the rotors, in use, to undergo cyclic counterphased variations in speed such that the pistons of the two rotors alternately approach and recede from each other and the expansion, exhaust, induction and compression phases of a combustion cycle can be carried out between the pistons making use of the inlet, exhaust and ignition means; means for providing at least one charge-transfer phase in the combustion cycle between induction of a charge and its compression; a transfer port disposed in said cylinder through which each charge transfer past a given piston is effected by a following piston as the given piston is moving slowly in the course of its speed variation, the number of charge transfer phases in each combustion cycle being equal to the number by which the number of pistons on each rotor exceeds two; and at least one exhaust-heat exchanger for the passage therethrough of the transferred charge, the said



rotor constraining means including a mainshaft coaxial with the rotors; at least one mainshaft gear eccentrically mounted on the mainshaft; a plurality of intermediate shafts; intermediate gears mounted on the intermediate shafts and meshing with the said at least one mainshaft gear; phase-control shafts connected to be driven by the rotors; phase-control gears mounted on the phase-control shafts and meshing with the intermediate gears; the speed relation between rotors and mainshaft being $x : 1$ where x is the number of pistons in each rotor, and each intermediate shaft, while free bodily to approach and recede from the axis of the mainshaft as it rotates, being maintained at a constant axial spacing from said at least one mainshaft gear on the one hand and the respective phase control shaft on the other hand.

4,004,556

ROTARY INTERNAL COMBUSTION ENGINE OF AXIALLY SLIDING VANE TYPE

Rolf Alfons Pfeiffer, 144 Quebec Ave., Toronto, Ontario, Canada M6P-2T7

Continuation-in-part of Ser. No. 68,613, Sept. 1, 1970, abandoned. This application Feb. 16, 1973, Ser. No. 333,010

Claims priority, application Germany, Sept. 8, 1969, 1945388

Int. Cl.² F02B *55/14;* **F01C** *1/00;* **F04C** *17/00;* **F01C** *21/00*

U.S. Cl. 123—8.45 **5 Claims**

1. A rotary machine which comprises:

i. a stator housing including axially spaced apart first and second side walls with opposed radially extending annular surfaces of spaced corresponding annular and generally sinusoidal configuration in the direction of the rotary axis thereof having a substantially constant axial separation;

ii. an inner wall extending between said first and second side walls of said stator housing and having a cylindrical peripheral outer surface;

iii. an outer wall extending between said first and second side walls of said stator housing and having a cylindrical peripheral inner surface generally parallel to said cylindrical peripheral outer surface of said inner wall;

iv. a rotary shaft journalled in said stator housing for rotation therein;

v. rotor means connected to said rotor shaft and extending from said inner wall to said outer wall and between said first and second side walls of said stator housing in axially spaced apart disposition thereto so as to define with said

a. annular surfaces of said first and second side walls of said stator housing, with said

b. cylindrical peripheral outer surface of said inner wall and with said

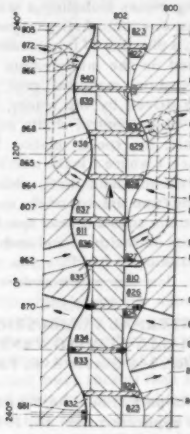
c. cylindrical peripheral inner surface of said outer wall, first and second continuous and essentially mutually isolated stator chambers on opposite axial sides of said rotor body;

vi. a plurality of vanes axially movably supported in said rotor means and extending between said annular surfaces of said first and second side walls of said stator housing and between said cylindrical peripheral outer surface of said inner wall and said cylindrical peripheral inner surface of said outer wall to divide each of said first and second stator chambers into a plurality of essentially mutually isolated compartments;

vii. a fluid inlet passage in said stator housing and in fluid communication with at least one of said stator chambers for the sequential supply of a fluid material to individual ones of said compartments of said stator chamber on rotation of said rotor means in said stator housing; and

viii. a fluid discharge passage in said stator housing and spaced apart from said fluid inlet passage and in fluid communication with said stator chamber for the sequential discharge of fluid material from individual ones of said compartments of said stator chamber;

whereby, on rotation of said rotor means within said stator housing, said vanes and said rotor means undergo relative axial movement to cause variation in the volumes of said



compartments of said stator chamber and to cause, in turn, fluid material introduced sequentially into said compartments of said stator chamber through said fluid inlet passage to be discharged sequentially from said compartments of said stator chamber through said fluid discharge passage; and in which each of said first and second side walls of said stator housing is formed with three said complete and generally sinusoidal configurations, each said side wall including first, second and third crest disposed in close proximity to but axially spaced apart from said rotor means, which machine additionally includes a first ignition means operatively associated with said stator chamber in general proximity to the third crest of said first side wall and in which a discharge passage and a first inlet passage communicate with said stator chamber on opposite sides of said first crest and in which a second discharge and a second inlet passage communicate with said stator chamber on opposite sides of said second crest and in which a third inlet passage communicates with said stator chamber at said third crest, said second discharge passage at said second crest and said third inlet passage at said third crest being in fluid communication through a transfer passage extending through said stator housing whereby on rotation of said rotor means fluid material being introduced sequentially into said compartments of said stator chamber through said first inlet passage and discharged through said second discharge passage into said transfer passage and fresh fluid material being introduced into said compartments through said second inlet passage with subsequent further supply of said fluid material from said transfer passage through said third inlet passage so as to increase the volume of fluid material supplied to said compartments, said fluid material being discharged through said first discharge passage, whereby said stator chamber can operate on a 4-stroke cycle.

4,004,557

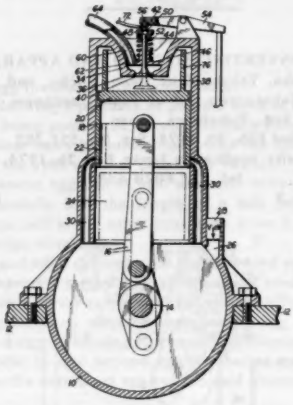
PISTON-CYLINDER ASSEMBLY

Otto H. Acker, Box 2, Washougal, Wash. 98671

Filed June 4, 1975, Ser. No. 583,684

Int. Cl.² F02D *39/04*

U.S. Cl. 123—65 VC **1 Claim**



1. A piston-cylinder assembly for internal combustion engines comprising a cylinder having cylinder walls and means defining a top firing chamber, a crankcase communicating with said cylinder, a drive shaft in said crankcase, a piston in said cylinder operably connected to said drive shaft and arranged for reciprocating movement in said cylinder between upper and lower positions, a cup-like extension in said cylinder depending into said firing chamber, said piston having a top end wall, a depending skirt portion integral with said end wall and an upwardly extending tubular baffle integral with said end wall, said tubular baffle being of smaller diameter than said piston but of larger diameter than said cup-like extension whereby to receive the latter in the upper position of said piston, valve means mounted in said extension and cooperating with said cylinder for controlling the inlet of fuel and for scavenging exhaust gases, air passageway means extending from said crankcase to an upper portion of said cylinder which is above the top end wall of said piston and in the area of said baffle in said down position of said piston, and valve controlled air inlet means in said crankcase.

4,004,558

HYDRAULIC LASH ADJUSTER OIL METERING VALVE

Elias W. Scheibe, Grand Rapids, Mich., assignor to General Motors Corporation, Detroit, Mich.

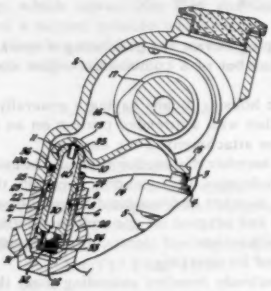
Filed Sept. 2, 1975, Ser. No. 609,600

Int. Cl.² F01M *9/10*

U.S. Cl. 123—90.35 **3 Claims**

1. In a hydraulic lash adjuster, a cylindrical outer dash pot body, a hollow plunger telescopically received in said outer dash pot body with one end of said plunger extending outward from said outer dash pot body, said one end terminating in a semi-spherical end having an axial extending passage means

therethrough to the interior of said plunger, the interior of said plunger constituting a reservoir for supplying fluid to said outer dash pot body inwardly of said plunger and for delivery out through said passage and, a metering valve for controlling flow from the interior of said plunger outward through said passage, the improvement wherein said passage means includes a first bore portion extending from the outer surface of said semi-spherical end, a second bore portion of a smaller diameter than said first bore portion, said first bore portion and said second bore portion meeting coaxially with an intervening inclined shoulder providing a valve seat and, wherein said metering valve includes an annular head with a depending, hollow shank extending from one side thereof, said shank



having a first shank portion next adjacent said head of a predetermined axial length greater than the axial length of said passage and having an outside diameter less than the inside diameter of said second bore portion to provide an oil metering passage between said first shank portion and the inside diameter of said second bore portion, said shank further having a second shank portion next adjacent the free end thereof, said second shank portion having a major outside diameter greater than the inside diameter of said second bore portion, said head being of a diameter larger than the outside diameter of said first portion of said shank, both the diameter of said head and said major outside diameter of said second shank portion being less than the diameter of said first bore portion.

4,004,559

ALARM DEVICE FOR USE IN EXHAUST GAS RECIRCULATING SYSTEM

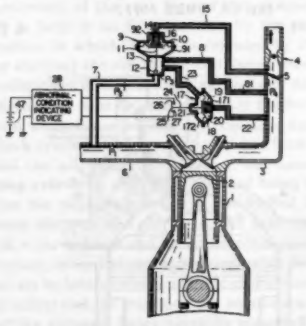
Tomo Itoh, Katsuta, Japan, assignor to Hitachi, Ltd., Japan

Filed Nov. 5, 1974, Ser. No. 521,095

Claims priority, application Japan, Nov. 9, 1973, 48-125305

Int. Cl.² F02M *25/06*

U.S. Cl. 123—119 A **4 Claims**



1. In an exhaust gas recirculating system including an exhaust gas recirculating passage for introducing a final portion of an exhaust gas from an internal combustion engine into a suction system of an engine and an exhaust gas control valve driven by action of a negative pressure in the vicinity of a throttle valve for metering the exhaust gas in the recirculating passage, an alarm means for detecting abnormal exhaust gas recirculation in the recirculating system and issuing an alarm signal comprising:

means for comparing pressures between the recirculating passage portion downstream from said control valve and the suction system of an engine,

means for detecting actuation of said control valve driven by action of a negative pressure applied to said control valve,

signal control means operable in response to signals from said comparing means and said detecting means, and

abnormal recirculation indicating means associated with said control signal whereby said control signal means actuates said abnormal recirculation indicating means both when an excess exhaust gas is recirculated and when no exhaust gas is recirculated at a time when recirculation is desired.

4,004,560

INTERRUPTER FOR THE IGNITION SYSTEM OF INTERNAL COMBUSTION ENGINES

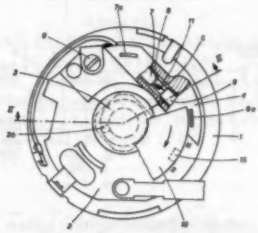
Josef-Heinrich Brungsberg, Ludenscheid, Germany, assignor to Brown, Boveri & Cie A. G., Mannheim, Germany

Continuation of Ser. No. 432,367, Jan. 10, 1974, abandoned. This application Oct. 14, 1975, Ser. No. 621,918

Claims priority, application Germany, Jan. 18, 1973, 2302287

Int. Cl.² F02P *1/00*

U.S. Cl. 123—148 E **1 Claim**



1. An interrupter for ignition systems of internal combustion engines including

a. a fixed, normally open reed-type switch having a pair of relatively movable contacts enclosed in a gas-tight envelope for controlling the primary circuit of an ignition coil;

b. a rotatable magnet system for operating said reed-type switch, said magnet system having a plurality of spaced alternating zones of opposite magnetic polarity;

c. a shaft supporting said magnet system arranged at right angles to the axis of said reed-type switch;

d. a pair of magnetizable reed-energizing elements each having one end immediately adjacent to one of said pair of contacts of said reed-type switch and another end remote from said pair of contacts of said reed-type switch and immediately adjacent to the trajectory of said zones of opposite magnetic polarity of said rotatable magnet system; wherein the improvement comprises in that

e. the rotatable magnet system is substantially in the shape of a toroid consisting of magnetic particles and an insulating binder therefor and radially magnetized so as to form a plurality of sectors each having opposite polarities on opposite ends thereof, contiguous of said plurality of sectors being separated from each other by intervening non-magnetic sectors, said reed-type switch opening and closing during said plurality of sectors of opposite magnetic polarity of said magnet system passes the ends of said reedenergizing elements;

f. said reed-type switch is housed for itself inside a separate socket of insulating material totally enclosing said reed-type switch except the ends of said reed-energizing element, said socket having a pair of slots forming passageways narrowly surrounding and positioning said reed-energizing elements, said reed-energizing elements and said passageways being bent so that the ends of said reed-energizing elements are situated above said reed-type switch in a cylindrical surface juxtaposed to the lateral surface of said rotatable magnet system; and

g. said socket further supporting a pair of terminals for connecting said reed-type switch into an electric circuit.

4,004,561

IGNITION SYSTEM

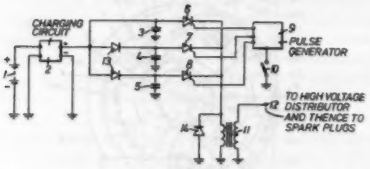
Klaus-Dietrich Thieme, Wedel, Holstein, Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed Sept. 14, 1972, Ser. No. 288,989

Claims priority, application Germany, Sept. 14, 1971, 2145790; Feb. 25, 1972, 2209006; Feb. 25, 1972, 2209007; Feb. 25, 1972, 2209008

Int. Cl.² F02P *1/00*

U.S. Cl. 123—148 CB **9 Claims**



1. In a high voltage capacitor ignition system having capacitive storage means for storing energy required for developing fuel ignition pulses for the spark plugs of an engine, the system further including charging circuit means connected between the capacitive storage means and a battery for charging the capacitive storage means, ignition transformer means, and switching means coupled between the capacitive storage means and the transformer means for temporarily discharging the capacitive storage means via the transformer means to develop pulses therein for application to each such spark plug in succession, the improvement wherein: said capacitive storage means comprise a plurality of capacitors each connected to receive charging current from said charging circuit means; and said switching means comprise a plurality of thyristors each coupled between a respective one of said capacitors and a common input of said transformer means and arranged to be fired at successive time intervals to discharge said capacitors in succession to apply a succession of fuel ignition pulses to each spark plug, the succession of pulses thus establishing an effective fuel ignition spark duration proportional to the number of said capacitors, each of said thyristors including a firing electrode and a pair of current-carrying electrodes, and said switching means further comprising firing pulse generator means including a clock pulse generator for producing a plurality of successive clock pulses, and means, including shift register means having a clock pulse input operatively coupled to said clock pulse generator means for receiving the clock pulses produced thereby, for feeding each of the successive pulses to the firing electrode of a respective one of said thyristors so that each of said thyristors is fired in turn.

4,004,562

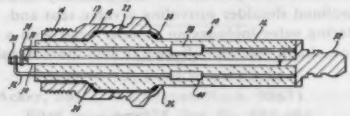
MULTIPLE AIR GAP SPARK PLUG HAVING RESISTIVE ELECTRODE COUPLING

William G. Rado, and Allen H. Turner, both of Ann Arbor, Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Dec. 26, 1974, Ser. No. 536,665

Int. Cl.² H01T *13/20*

U.S. Cl. 123—169 MG **8 Claims**



1. A spark plug device for generating a spark within the combustion chamber of a combustion engine comprising in combustion:

a conductive housing means having a generally cylindrical configuration with a threaded portion on an end thereof adapted for attachment to the engine;

an insulting member disposed within said housing;

a first electrode member extending generally through said insulating member and insulated thereby from the housing means and adapted on one end for electrical communication with a source of electrical energy and adapted on another end for sparking;

a second electrode member extending from the threaded end portion of said housing means and arranged to provide a portion thereof, adapted for sparking, in confronting relation to the end of said central electrode adapted for sparking;

a third electrode means positioned intermediate said first and second electrode means cooperative with said first electrode member to define a first air gap and cooperative with said second electrode member to define a second air gap, said second air gap being generally colinear with said first air gap; and

high resistance coupling means electrically conductively connected to said third electrode means arranged to provide a high resistance electrical connection between said third electrode means and the source of electrical energy whereby said first and second air gaps will break down electrically in sequence.

4,004,563

SPARK IGNITION ENGINE USING LEAN AIR-FUEL MIXTURE

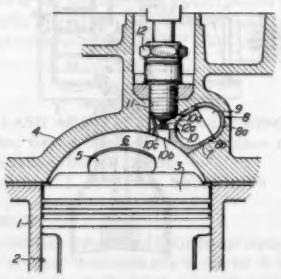
Norihiko Nakamura, Mishima, and Fujio Nakayama, Toyota, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Nov. 26, 1974, Ser. No. 527,301

Claims priority, application Japan, Aug. 24, 1974, 49-97354

Int. Cl.² F02B *19/12*

U.S. Cl. 123—191 S **6 Claims**



1. An internal combustion engine comprising a cylinder, a cylinder head attached to one end of said cylinder, a piston

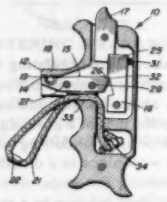
slidably fitted within said cylinder, a main combustion chamber defined between the inner surface of said cylinder head and the top surface of said piston, a recess provided on the inner surface of said cylinder head, an auxiliary chamber element securely fitted into said recess and defining therein an auxiliary combustion chamber, a passage means communicating said auxiliary combustion chamber with said main combustion chamber, and a spark plug having its spark gap exposed in said passage means, whereby a part of the air-fuel mixture sucked into said main combustion chamber is pushed through said passage means into said auxiliary combustion chamber in the compression stroke and ignited by said spark plug and the flame thus produced burns through said passage means the air-fuel mixture in said main combustion chamber, the improvement in which said passage means comprises a first passage which opens into said auxiliary combustion chamber and a second passage which opens into said main combustion chamber, said first and second passages intersecting at an angle with each other.

4,004,564

BOW STRING RELEASE

Leon H. Castonguay, Wheelright, Mass., assignor to Astratronics, Inc., Wheelwright, Mass.

Filed June 26, 1975, Ser. No. 590,637
Int. Cl.² F41C *19/00*
U.S. Cl. 124—35 A **6 Claims**



1. A bow string release, comprising:

a. a housing,

b. a nib moveably mounted in the housing between a first position in which a bow string is held and a second position in which the bow string is released, the nib being biased by the bow string toward the second position when the bow string is released, the nib being mounted on a nib bar and the nib bar being pivotally mounted to the housing,

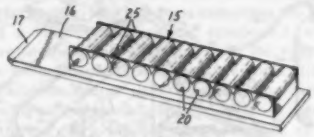
c. a lock mechanism mounted in the housing, the locking mechanism including a sear and an actuator, extremely small movement of the actuator causing extremely small movement of the sear from a lock position in which the nib is held in its first position by the sear to a release position in which the nib is released by the sear, the nib bar carrying the nib at one end, being pivoted at an intermediate portion and carrying an edge at a second end, wherein the sear bar is mounted in the housing for movement away from the nib bar, the sear bar having a sear which overlap the edge of the nib bar from time to time to hold the nib bar from pivoting, the amount of overlap being extremely short and the sear being moveable away from the edge with the sear bar to end the overlap between the sear and the edge, the sear bar having a first end, a second end and an intermediate portion and being pivotally mounted in the housing by its first end, with the sear on its intermediate portion, and wherein the actuator has a first end, an intermediate portion and a second end, and the actuator being pivotally mounted in the housing at its intermediate portion with its first end engaging the second end of the sear bar and its second end extending outwardly of the housing.

4,004,565

CLIP FOR SUPPLYING IMPLANT PROJECTILES

Earl Lee Fischer, Bentonville, Ark., and Jay W. Gould, III, Bloomington, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 14, 1975, Ser. No. 567,495
Int. Cl.² F41C *25/00*
U.S. Cl. 124—45 **18 Claims**



1. A clip for hygienic ballistic implant projectiles containing a biologically active material comprising:

a rectangular structure having a plurality of chambers with parallel axes and indexing means associated with each of said chambers for use in registering said chambers in a gun and indexing the chambers seriatim,

ballistic implant projectiles containing a biologically active material positioned in said chambers, and

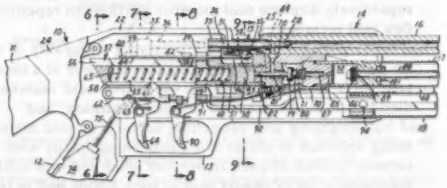
mechanically rupturable sealing means at each end of each of said chambers for individually isolating each of said chambers from the ambient environment and so that a device may penetrate the sealing means at one end of a chamber and force the projectile through the sealing means and out the chamber at the other end of the chamber.

4,004,566

CLIP AND INDEXING MECHANISM FOR A GAS-OPERATED GUN

Earl Lee Fischer, Bentonville, Ark., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 14, 1975, Ser. No. 567,496
Int. Cl.² F41B *11/00*
U.S. Cl. 124—59 **10 Claims**



1. A gun comprising:

a housing,

a barrel on said housing for receiving a projectile;

a breechblock for sealing one end of the barrel, said breechblock being reciprocally mounted in said housing and having obturator means for placing the projectile in the barrel;

hammer means movable within said housing for firing a said projectile, said hammer means being moved to the cocked position upon reciprocation of the breechblock;

indexing means for advancing a clip in said housing to position successive chambers with projectiles therein in alignment with said barrel and the path of said obturator means, and

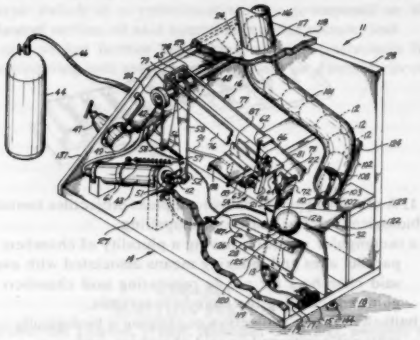
disabling means to prevent operation of said indexing means to advance said clip upon subsequent reciprocation of said breechblock when said hammer means is in said cocked position, whereby said clip cannot be advanced by said indexing means and additional projectiles placed in the barrel until the first projectile is fired.

4,004,567

APPARATUS AND METHOD FOR AUTOMATICALLY PROPELLING GAME BALLS FOR PRACTICE

Michael L. Henderson, 3505 E. John, Seattle, Wash. 98102

Filed June 6, 1975, Ser. No. 584,619
Int. Cl.² F41B *11/00*
U.S. Cl. 124—61 **16 Claims**



1. An apparatus for propelling tennis balls with spin so as to simulate the action of a tennis ball delivered by a spin imparting tennis racket stroke, comprising in combination:

support means for providing a support;

an elongate, pliable, ball propelling member having longitudinally spaced apart portions and defining a ball engaging and propelling surface thereon lying between said portions;

member tensioning means mounted on said support means and connected to said portions of said member for differentially displacing said member portions relative to said support means to flex said member between a slackened, looped condition and a tensioned, generally straightened condition and simultaneously cause longitudinal displacement of said surface of said member relative to said support means;

control means operatively associated with said member tensioning means for operating said tensioning means to repetitively displace said member portions to repetitively flex said member;

ball feeding means adapted for receiving a plurality of tennis balls for successively feeding the balls one at a time to said surface of said member each time said member is disposed in said slackened, looped condition; and

said ball engaging and propelling surface of said member being selected to effect frictional engagement with the exterior surface of each tennis ball when fed into contact therewith so as to impart spin to such tennis ball in reaction to said longitudinal displacement of said surface of said member as said member simultaneously propels the ball by reason of the flexure of said member toward said tensioned, straightened condition.

13. A method of propelling balls comprising:

disposing longitudinally spaced apart portions of an elongate pliable member in an initial relatively proximate relationship to cause said member to assume a slackened, looped condition between said portions;

disposing a ball in a launching position adjacent an inwardly curved surface of said member lying between said portions when said member is in said slackened, looped condition;

displacing said member portions differentially with respect to said launching position of said ball and toward a relatively distal relationship to flex said member to a tensioned, generally straightened condition propelling said ball outwardly from said surface and simultaneously spinning said ball; and

wherein said step of displacing said member portions includes the sub-steps of:

producing a pneumatically powered force;

storing said pneumatically powered force in an energy storage means operatively connected to said member;

releasing an impulse of energy from said energy storage means; and

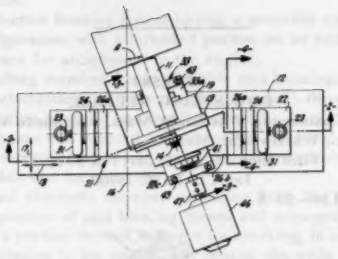
applying said impulse of energy from said storage means to said member to effect said step of displacing said member portions.

4,004,568

METHOD AND APPARATUS FOR DRESSING REGULATING WHEELS FOR CENTERLESS GRINDERS

Van Q. Maxey, Morgan Hill, Calif., assignor to Engelhard Minerals & Chemicals Corporation, Murray Hill, N.J.

Filed July 18, 1975, Ser. No. 597,022
Int. Cl.² B24B *17/02, 53/04*
U.S. Cl. 125—11 TP **12 Claims**



1. In a method for dressing a regulating wheel for use in a centerless grinding machine wherein the regulating wheel is mounted for rotation about an axis inclined at a predetermined angle relative to the axis of a grinding wheel for holding workpieces against the peripheral cutting edge of the grinding wheel and feeding the workpiece in a direction parallel to the axis of said grinding wheel, the steps of: rotating a dressing wheel about an axis inclined relative to a reference axis by an angle corresponding to the predetermined angle, orienting the axis of the regulating wheel in a plane parallel to the axis of the dressing wheel, rotating the regulating wheel about its axis, and effecting relative movement of the rotating wheels in a direction parallel to the reference axis with the outer periphery of the dressing wheel engaging the outer periphery of the regulating wheel for dressing the same.

4,004,569

METHOD AND APPARATUS FOR REMOVING SET MORTAR FROM RECOVERED BUILDING BRICKS

Paul B. Stephens, 1234 South Wabash Ave., Chicago, Ill. 60605

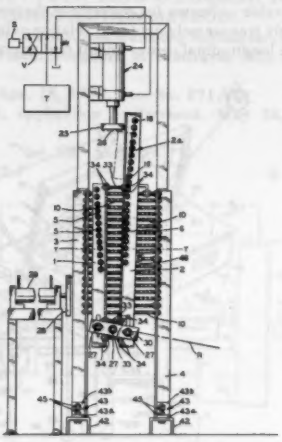
Filed May 19, 1975, Ser. No. 578,628
Int. Cl.² B28D *1/00*
U.S. Cl. 125—26 **17 Claims**

1. A method of removing set mortar from a used building brick which has opposite side faces, opposite edge faces, and opposite end faces, and comprising:

forcing a used brick, by pressure applied to one end, to travel endwise in one direction, along a predetermined path having four sides, each of which, at each location along its length, is in fixed relation to the other sides, and, as the brick travels along said path, progressively with the travel thereof, applying components of non-yieldable reactive forces to mortar on all of said side and edge faces concurrently, said components being in directions both across and endwise of said path and, in the general planes of each of the associated side and edge faces, respectively, crosswise and endwise thereof;

during said travel of the brick along said path, progressively increasing said components of reactive forces, after initial

application thereof, until the mortar is dislodged or is disintegrated; and



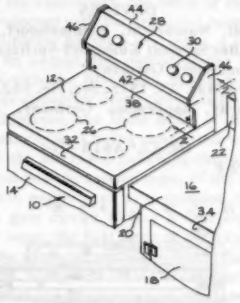
continuing the travel of the brick and removal of mortar from said side and edge faces until the mortar thereon is removed substantially to its full thickness from the entire side faces and edge faces, respectively.

4,004,570

ADJUSTABLE FASTENING MEANS BETWEEN RELATED MEMBERS

Kermit B. Keeling, Sr., Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Sept. 16, 1975, Ser. No. 613,810
Int. Cl.² A47J 49/00; F24C 3/12
U.S. Cl. 126—214 B **9 Claims**



1. An appliance having a top working surface and an adjustably mounted control housing supported thereon, said control housing being a generally hollow box-like configuration, an adjustable locking means located within the control housing for holding it in place, the locking means including a movable mounting bracket for joining the control housing to the working surface for movement within a given range of positions, the locking means also including a combined generally vertically movable clamp and a generally horizontally movable cam that is capable of acting therewith, and adjusting means cooperating with the cam for shifting it either back or forth, the combined clamp and cam including cooperative inclined means such that whenever the cam moves horizontally, a resultant vertical movement occurs of the clamp, the clamp including flange means for engaging or disengaging the working surface.

4,004,571

ISOMERIZATION FOR PHOTOCHEMICAL SOLAR ENERGY STORAGE

Robert E. Schwerzel, and Richard A. Nathan, both of Columbus, Ohio, assignors to Battelle Development Corporation, Columbus, Ohio

Filed June 30, 1975, Ser. No. 592,030
Int. Cl.² F24J 3/02; F24H 7/00
U.S. Cl. 126—270 **5 Claims**

1. A process for photochemical collection, storage, and retrieval of solar energy, which process comprises the steps of:

a. exposing a valence isomerizable compound, which is responsive to absorbing solar energy in the visible light spectrum while dissolved, dispersed, or both, in a liquid medium, to solar energy radiation for a time converting by means of an intramolecular cyclization a significant portion thereof to a strained ring structure of higher energy content;

b. retaining the strained ring structure of higher energy content until energy release is desired therefrom; and

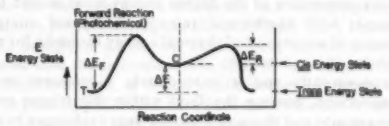
c. heating the strained ring structure of higher energy content to a temperature initiating exothermal conversion thereof to its initial molecular structure with release of heat in excess of that requisite for initiating and continuing the conversion and with the heat in excess thereof available for useful thermal energy applications.

4,004,572

SOLAR ENERGY COLLECTION AND RETRIEVAL EMPLOYING REVERSIBLE PHOTOCHEMICAL ISOMERIZATION

Richard A. Nathan; Robert E. Schwerzel; Albert H. Adelman, all of Columbus, and Robert E. Wyant, Delaware, all of Ohio, assignors to Battelle Development Corporation, Columbus, Ohio

Filed June 30, 1975, Ser. No. 592,029
Int. Cl.² F24H 7/00; F24J 3/02
U.S. Cl. 126—270 **13 Claims**



1. A process for photochemical collection and retrieval of solar energy, which process comprises the steps of:

a. exposing to solar radiation the trans-isomer of a geometrical isomerizable compound for a time sufficient to convert a significant portion thereof to its cis-isomer with the trans-isomer dissolved and/or dispersed in an aqueous liquid medium comprised of at least 50 percent by volume of water, which trans-isomer of the compound possesses the properties of undergoing geometrical isomerization to the cis-isomer upon exposure to light wavelengths between 350 nm and 1200 nm with an absorbance maxima of said light for the cis-isomer at a shorter wavelength than the absorbance maxima of the trans-isomer having the properties of an absorbance maxima lying between the wavelengths of 350 nm and 800 nm;

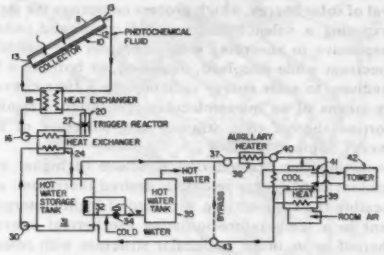
b. heating the cis-isomer to a temperature initiating a triggering of an exothermal conversion thereof to the trans-isomer with released thermal energy obtained; and

c. containing the exothermal conversion of cis-isomer to trans-isomer through utilization of a portion of the released thermal energy and without additional heat added thereto and with another portion of the released thermal energy transferred from the region of exothermal conversion for availability for useful thermal energy application.

4,004,573
PROCESS AND APPARATUS FOR SOLAR ENERGY COLLECTION AND RETRIEVAL

Donald H. Frieling; Sherwood G. Talbert, and Richard A. Nathan, all of Columbus, Ohio, assignors to Battelle Development Corporation, Columbus, Ohio

Filed Dec. 23, 1975, Ser. No. 643,829
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 **13 Claims**



1. For collection, retrieval, and utilization of solar energy, a process comprising the steps of:

a. exposing to solar radiation an isomer of an isomerizable compound contained in a fluid within a collector means adapted for transmission of the solar radiation to the fluid, which isomer is capable of and undergoes isomerization to a higher energy level isomer upon said exposing to the solar energy;

b. passing the fluid, now containing higher energy level isomer, from the collector means into and through a first heat exchanger to elevate its temperature by transfer thereto of sensible heat from the fluid containing the isomer subsequently flowed into and through the collector means for said exposing;

c. flowing the fluid, containing the higher energy level isomer and now at an elevated temperature, from the first heat exchanger into a trigger-reactor means capable of initiating and maintaining and which initiates and maintains conversion of the higher energy level isomer to the isomer with exothermic release of thermal energy in excess of an amount of thermal energy requisite for maintaining the conversion;

d. concurrently and/or immediately subsequent to said conversion, passing the fluid within the trigger-reactor means into and through a second heat exchanger to transfer sensible heat therefrom and to elevate the temperature of a material adapted for storage at an elevated temperature until desiring sensible heat thereof for a useful purpose; and,

e. after passing through the second heat exchanger, passing the fluid through the first heat exchanger to transfer sensible heat therefrom to the fluid containing higher energy level isomer before the subsequently flowing of the fluid into the collector means for said exposing.

4,004,574
SOLAR ENERGY CONCENTRATING AND COLLECTING ARRANGEMENT WITH SUN-FOLLOWER AND SOLAR ENERGY SENSING POWER CONTROL AND METHOD

Irwin R. Barr, Baltimore County, Md., assignor to AAI Corporation, Cockeysville, Md.

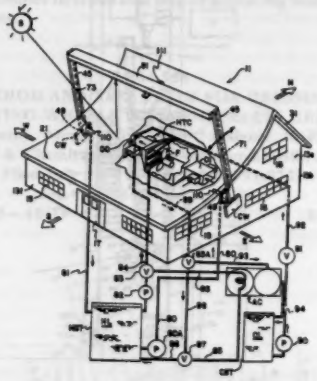
Filed Nov. 20, 1974, Ser. No. 525,545
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 **13 Claims**

1. A solar energy concentrating and collecting arrangement, comprising

a generally upwardly facing concave generally semi-cylindrical reflector-concentrator having a longitudinal axis,

and a movable solar energy collector mounted for movement above said reflector-concentrator, in a direction transverse to said longitudinal axis,

differential solar energy-sensing means disposed on said movable collector for movement therewith and in effectively transversely centered relation relative to the effective longitudinal center line of said movable collector and



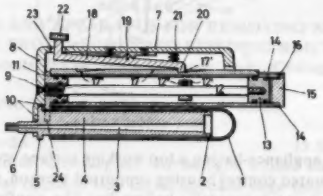
having a differential energy-sensing direction oriented transversely of said longitudinal axis of said reflector-concentrator,

and means for moving said collector transversely of said longitudinal axis extent of said semi-cylindrical reflector-concentrator as a function of solar energy sensed by said differential energy-sensing means.

4,004,575
APPARATUS FOR LOADING BLOOD EXTRACTING DEVICES

Walter Sarstedt, Numbrecht, Rommelsdorf, Germany, assignor to Walter Sarstedt Kunststoff-Spritzgusswerk, Nuembrecht, Rommelsdorf, Germany

Filed Mar. 27, 1975, Ser. No. 562,613
Claims priority, application Germany, Apr. 2, 1974, 2415835
Int. Cl.² A61B 5/14
U.S. Cl. 128—2 F **9 Claims**



1. An apparatus for loading blood extracting devices comprising:

a casing means;

a pneumatic means connected to said casing means and adapted to assume a manually biased, partially evacuated state and an unbiased less evacuated state;

a locking means for locking said pneumatic means in said biased partially evacuated state; and,

a blood extracting device attached to said casing means and to said pneumatic means and adapted to extract blood when said pneumatic means moves from said biased state to said unbiased state.

4,004,576

DIRECT INDICATOR DEVICE FOR DETERMINING THE CARDIAC OUTPUT FLOW RATE ACCORDING TO THE THERMODILUTION METHOD

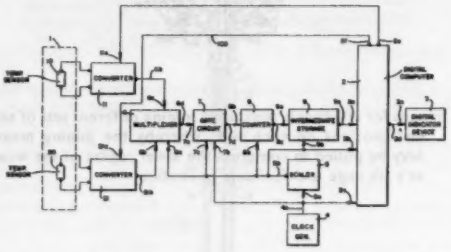
Hermann Gähwiler, Zurich, and Hansjörg Schlaepfer, Winkel, both of Switzerland, assignors to Contraves AG, Zurich, Switzerland

Filed Apr. 28, 1975, Ser. No. 571,976

Claims priority, application Switzerland, May 24, 1974, 7100/74

Int. Cl.² A61B 5/02

U.S. Cl. 128—2.05 F **6 Claims**



1. A direct indicator device for the determination of the cardiac output according to the thermodilution method, comprising two temperature sensors adapted to be connected to the blood circulation of a patient for the respective determination of the inlet temperature and the dilution temperature of a liquid injected into the blood circulation of the patient, the temperature of the injected liquid deviating from the blood temperature, a clock generator having an output, a scaler having an input and an output, the output of the clock generator being connected with the input of the scaler for forming a control signal, two temperature-pulse frequency converters, each of said temperature-pulse frequency converters having first input means second input means and an output, one of the temperature sensors being connected with the first input means of one of the converters, the other of the temperature sensors being connected with the first input means of the other converter, a multiplexer having a first input, a second input, a third input and an output, the output of the one converter being connected with the first input of the multiplexer, the output of the other converter being connected with the second input of the multiplexer, the third input of the multiplexer constituting a control input being connected with the output of the scaler for the alternate switching-through of a signal from the first input and the second input of the multiplexer to the output of such multiplexer as a function of time of the control signal, a gate circuit having a first input, a second input and a third input, the first input of the gate circuit being connected with the output of the multiplexer, the second input of the gate circuit being connected with the output of the clock generator, and the third input of the gate circuit being connected with the output of the scaler, the gate circuit having an output at which appears the clock rate of the clock generator as a function of time of the control signal and the signal at the output of the multiplexer, a counter having a first input, a second input and an output, the first input of the counter being connected with the output of the gate circuit, an intermediate storage having a first input, a second input and an output, the output of the counter being connected with the first input of the intermediate storage, the second input of the counter and the second input of the intermediate storage each defining a respective control input and being connected with the output of the scaler for the summation of the clock repetition rate delivered to the counter and for the storage thereof as a function of time of the control signal, a digital computer having a first input, a second input and a third input and at least one output, a digital indicator device having an input connected with the output of the digital computer, the first input of the digital computer being connected with the output of the intermediate storage, the second input of the digital computer being connected with the output of the clock generator and the third input of the digital computer being connected with the output of the scaler.

4,004,577

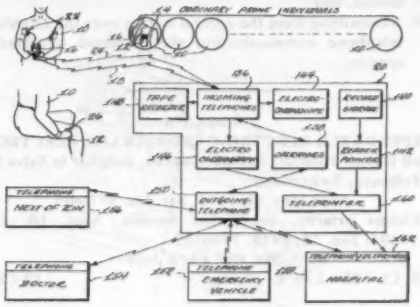
METHOD OF TREATING HEART ATTACK PATIENTS PRIOR TO THE ESTABLISHMENT OF QUALIFIED DIRECT CONTACT PERSONAL CARE

Stanley J. Sarnoff, Bethesda, Md., assignor to Survival Technology, Inc., Bethesda, Md.

Continuation of Ser. No. 311,835, Dec. 4, 1972, abandoned, which is a continuation-in-part of Ser. No. 296,841, Oct. 12, 1972, Pat. No. 3,870,035, which is a continuation of Ser. No. 55,647, July 17, 1970. This application July 15, 1974, Ser. No. 488,434

Int. Cl.² A61B 5/04

U.S. Cl. 128—2.06 R **10 Claims**



1. A method of participating in the pre-hospital phase treatment of coronary prone individuals by any one of said individuals and/or non-qualified persons in direct contact therewith at a time during the early minutes or hours after the onset of heart attack symptoms, each of which individuals has been previously provided with (1) a plurality of separate injectors suitable for self-administration under the disconcerting circumstances present during the aforesaid time, each containing a liquid dosage of a different medicament non-intravenously injectable into the individual effecting the self-administration of the injector, each of which medicaments (a) when so injected is generally effective to reduce the incidence of adverse cardiac conditions, such as ectopic beats, when the existing heart beat condition is within a different predetermined portion of the total range of heart beat conditions which may exist during an attack, and (b) may be inadvisable or unwise to inject when such heart beat conditions are outside the predetermined portion of the total range in which the medicament is effective as aforesaid, and (2) a diagnosing device having electrode means operable to be simply and conveniently disposed in operative relation to an individual for sensing the electrical impulses which trigger the heart beat and battery operated signal producing means operable when said electrode means is disposed in said operative relation to produce ECG signals indicative of the sensed heart beat conditions of the individual, said method comprising the steps of:

1. maintaining in a readily accessible and producible form medical history information of each of said individuals including standing orders by each individual's doctor as to an indicated medicament to be administered based upon an indicated range portion of the heart beat conditions of the individual existing at the time of an attack,
2. establishing at a central station communication by telephone with any one of said individuals experiencing heart attack symptoms,
3. receiving at said central station over the established telephone communication information as to the identity of the individual experiencing heart attack symptoms,

4. obtaining access to the maintained medical history information including said standing orders applicable to the identified individual,
5. producing the medical history information of the identified individual including the standing orders applicable thereto for utilization in formulating a qualified response,
6. receiving ECG signals over the established telephone communication which are (a) produced by the signal producing means of the device with said electrode means in operative relation to the individual experiencing heart attack symptoms and (b) transmitted over the established telephone communication,
7. producing the received ECG signals for utilization in formulating a qualified response,
8. utilizing the produced medical history information including said standing orders and the produced ECG signals to formulate a qualified response at the central station, such as would be arrived at by the individual's doctor, based upon the standing orders of the individual's doctor, and
9. transmitting from the central station over the established telephone communication the aforesaid qualified response.

4,004,578

EXPENDABLE ELECTRO-CARDIOGRAPH ELECTRODE

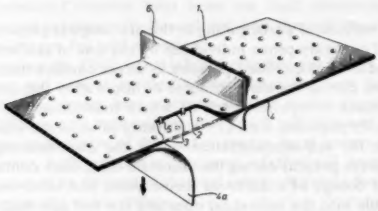
Kjell Hubert Palmius, Spanga, Sweden, assignor to Salve S.A., Fribourg, Switzerland

Filed May 14, 1975, Ser. No. 577,405

Claims priority, application Sweden, Sept. 10, 1974, 7411404; Jan. 22, 1975, 7500659

Int. Cl.² A61B *5/04*

U.S. Cl. 128—2.06 E **19 Claims**



1. An expendable electrode for electrocardiographic measurements comprising a thin pliable metallic sheet-like carrier member adaptable to flexibly conform to the shape of the body part on which it is to be applied and having means for attachment of means for conducting signals from said carrier member to electrocardiographic equipment, said carrier member having one side adapted to be applied to the body part and another side facing away therefrom, said one side being provided with a plurality of regularly distributed spikes devised to penetrate into the skin and a coating of an adhesive compound adapted to adhere to the body, said coating and spikes being completely covered by at least one pull-off protective foil thick enough to entirely embed said spikes.

4,004,579

RESPIRATORY ASSIST DEVICE

Richard G. Dedo, 8629 La Losa Drive, West, Jacksonville, Fla. 32217

Filed Oct. 8, 1975, Ser. No. 620,647

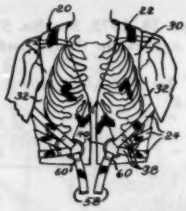
Int. Cl.² A61H *31/00*

U.S. Cl. 128—28 **20 Claims**

1. A respiratory assist device, comprising:

a garment of flexible material extending around the lower region of a wearer's rib cage;

a plurality of elongated compression straps retained on the garment, said straps having separate sets of circumferential side portions located on the garment adjacent opposed sides of the wearer and disposed to cover the lower region of the wearer's rib cage when the garment is worn, and having the separate sets of end portions extending from said side portions toward a location intermediate said side portions when the garment is worn; and



means for effectively separately joining different sets of said end portions on each side, whereby the joining means may be pulled to compress the lower region of the wearer's rib cage and facilitate expiration.

4,004,580

VIBRATORY MASSAGE APPARATUS

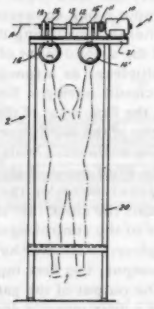
David Knobel, Spittel 38, CH 8762 Schwanden, Switzerland

Filed Aug. 7, 1975, Ser. No. 602,894

Claims priority, application Switzerland, Aug. 7, 1974, 10798/74

Int. Cl.² A61H *1/00*

U.S. Cl. 128—32 **10 Claims**



1. A vibratory massage apparatus comprising:

a pair of hand grips;

means for suspending said grips next to one another in an overhead position allowing a person to hang free by his hands from said grips; and

drive means including a motor for vertically limitedly reciprocating said grips with sufficient force to vibrate a person hanging by his hands from said grips, said motor having a shaft carrying a pair of eccentrics, each of said grips being mounted on a respective eccentric.

4,004,581

TOOL FOR FORMING A BED IN A HIP BONE TO RECEIVE AN ARTIFICIAL ACETABULUM

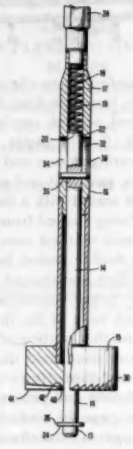
Günther Heimke, Mannheim; Peter Griss, Plankstadt; Hanns Von Andrian Werburg, Ilvesheim, and Paul Wachter, Mannheim, all of Germany, assignors to Friedrichsfeld GmbH, Mannheim, Germany

Filed Sept. 9, 1975, Ser. No. 611,782

Claims priority, application Germany, Sept. 11, 1974, 2443450

Int. Cl.² A61B *17/16, 17/32*

U.S. Cl. 128—92 E 10 Claims



1. In a tool for preparing a socket bed in a hip bone for the implantation of the socket of a complete hip joint endoprosthesis, wherein an elongated straight guide bore hole has previously been prepared in said hip bone at the proper inclination for the socket to be inserted which said socket is provided with a threaded exterior surface having a diameter greater than the diameter of said guide bore hole, the improvement which comprises an elongated guide rod to be rotatably received in said guide bore hole, said guide rod being axially, shiftably mounted in a rotary cutter for progressively removing material around said guide bore hole, means for rotating said cutter, and indicia means for measuring the depth of penetration of said cutter with respect to the lower end of the guide rod.

4,004,582

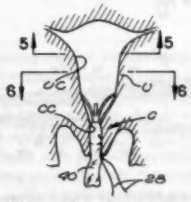
INTRACERVICAL CONTRACEPTIVE DEVICE

Robert M. Nakamura, 4633 Brown Deer Lane, Rolling Hills Estates, and Val Davajan, 1512 Addison Road, Palos Verdes Estates, both of Calif. 90274

Filed Oct. 28, 1975, Ser. No. 626,426

Int. Cl.² A61F *5/46*

U.S. Cl. 128—130 12 Claims



1. An intracervical contraceptive device, comprising:

a substantially hollow stem adapted to be operatively positioned in a cervical canal and to allow the flow of fluids from the uterus;

at least one arm connected to a first end of said stem, said arm extending outwardly into the uterine cavity to prevent inadvertent expulsion of said device;

means connected to said stem adapted to prevent spermatozoa from performing their fertilization function when the device is operatively positioned; and,

means for preventing portions of the device, other than said arm, from entering the uterine cavity when the device is operatively positioned.

4,004,583

RESTRAINING DEVICE

Daniel E. Johnson, 2293-6th Ave., Yuma, Ariz. 85364

Filed Jan. 2, 1975, Ser. No. 538,104

Int. Cl.² A61F *13/00;* A62B *35/00;* E05B *75/00*

U.S. Cl. 128—134 2 Claims

1. A restraining device of the character described comprising a first flexible strap, a second flexible strap secured at one end to said first strap intermediate the ends of said first strap, said first strap having secured to one face of that end portion which is contiguous with the second strap, a tape of one complementary part of a hook-loop fastener, said second strap having secured to that face which is in facing relationship with the said tape-covered portion of said first strap a similar complementary part of a hook-loop fastener, the opposite face of said second strap having secured thereto a tape of the complementary part of a hook-loop fastener, and an enlarged segment of said first strap, substantially thicker than the thickness of said strap and located away from the juncture of the said first and second straps and from the hook-loop fastener thereof, said first strap extending beyond said enlarged segment and away from said hook-loop covered strap portion.

4,004,584

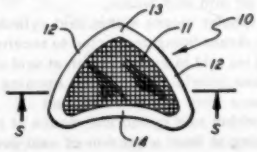
FACIALLY-WORN BREATHING FILTER

Sheila A. Geaney, Dundalk, Ireland, assignor to Allerald Company, Inc., Ithaca, N.Y.

Filed July 28, 1975, Ser. No. 599,665

Int. Cl.² A62B *23/06*

U.S. Cl. 128—140 N 4 Claims



1. A breathing filter adapted to be secured over at least one facial breathing orifice of a wearer, the filter having at least

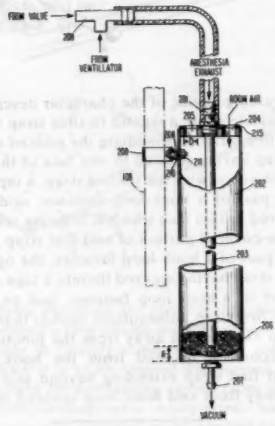
one filter area comprising a comparatively fine filtering area of a metallic monolayer mesh the mesh being formed of wires extending in lines in two directions at substantially 90° to one another, the wires being spaced apart about substantially rectangular openings between portions where the lines cross, the wires being substantially rectangular in cross section adjacent the openings and of the same single thickness where the lines cross, the metal wires being less than 0.0009 of an inch in thickness and in width around the openings and the wires in at least one direction being spaced apart less than 0.0009 of an inch at each opening, the sum of the open areas of the openings in the filter area being at least 40% of the total filter area, the filter area having at least one supporting layer of a comparatively coarse metallic mesh secured to the filtering mesh, the filtering area having therearound flexible sheet material impervious to the passage of air therethrough, the flexible sheet material being bonded to the edges of the filtering and support layers, and the outer edges of the sheet material having one surface bearing adhesive for bonding the sheet material outer edges to the skin of the wearer around the breathing orifice.

4,004,585

SAFETY INTERFACE FOR ANESTHESIA VACUUM SCAVENGING

John R. Boehringer, 427 Parkview Drive, Wynnewood, Pa. 19096

Filed Nov. 18, 1975, Ser. No. 632,894
Int. Cl.² A61M *16/00*
U.S. Cl. 128—145.8 **8 Claims**



1. In an anesthesia administration system having pressure relief valving in the patient circle and a vacuum exhaust from the valving, safety interface apparatus comprising:

an elongated cylindrical means having an interconnection with said vacuum exhaust at one end and an interconnection with said valving at its other end, said cylindrical means being closed to atmosphere at said one end and defining openings at said other end to allow free passage of ambient air into said means;

an elongated tubular means within said cylindrical means, said tubular means being connected to receive gases from said valving via said interconnection at said one end, said tubular means terminating with an opening a predetermined distance from said one end; and

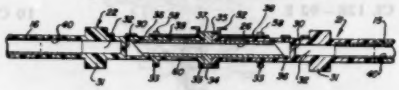
baffle means within said cylindrical means at said one end and occupying at least a portion of said predetermined distance between said one end and the termination of said tubular means for preventing a splashing effect which may occur due to sudden surges of exhaust gases from said valve means.

4,004,586

METHOD AND APPARATUS FOR SEALED, STERILE CONNECTION

John G. Christensen, Prairie View; Thomas R. Hektner, Wilmette, and Steven L. Olson, Lake Zurich, all of Ill., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Mar. 12, 1975, Ser. No. 557,853
Int. Cl.² A61M *5/14*
U.S. Cl. 128—214 D **20 Claims**



1. The method of transferring sterile contents from a first, sealed, sterile container, having a first, flexible, sealed, fluid transfer tube, to a second, sealed, sterile container having a second, flexible, sealed, fluid transfer tube, said first and second tubes communicating at one end with their respective sealed, sterile containers, said first and second tubes having a free end, and being each sealed with a diaphragm across their bores, said diaphragms being spaced from the free ends of said first and second tubes, said method comprising:

inserting one end of a double-ended, hollow spike into each of the bores of said first and second tubes at the free end thereof, said spike being proportioned to tightly and sealingly fit into each bore of the first and second tubes;

sterilizing said spike and that portion of said first and second tubes extending from each said diaphragm to the free ends of said tubes; and thereafter

axially collapsing said first and second tubes adjacent the free ends thereof to pass the ends of said spike through said diaphragms to open a flow channel between said first and second containers;

transferring said sterile contents through said fluid transfer tubes from said first to said second container; and resealing said second fluid transfer tube while sterility is retained in said second tube.

13. A sealed, sterile container having a sealed, flexible, sterile fluid transfer tube communicating at one end thereof with said container and having a free end; the improvement comprising:

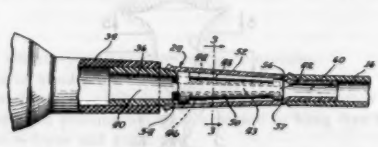
a diaphragm positioned across the bore of said tube, said diaphragm being spaced from the free end thereof, said tube being sufficiently flexible to permit manual axial collapse thereof adjacent said free end, and a removable clip member surrounding said fluid transfer tube adjacent the free end thereof, to prevent said axial collapse prior to removal of said clip member.

4,004,587

PARENTERAL LIQUID ADMINISTRATION SET WITH NON-AIR BLOCKING FILTER

Thurman Sheldon Jess, Mundelein, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed June 13, 1975, Ser. No. 586,665
Int. Cl.² A61M *5/16*
U.S. Cl. 128—214 R **10 Claims**



1. In a fluid flow apparatus which comprises a flow conduit means adapted for connection to a liquid source, and a filter positioned in communication with said flow conduit, the improvement comprising, in combination:

said filter comprising a housing, said housing carrying a first filter member and a separate, second filter member, in parallel flow position, whereby each increment of fluid flow through said flow conduit passes through one of said filter members, said first filter member being hydrophilic in nature to permit passage of aqueous liquid under normal liquid administration conditions, said second filter member being hydrophobic in nature to permit the passage of gas after said filter members have been in contact with aqueous liquid, whereby air-blocking of said filter is prevented, said filter members being closed from the exterior, and physically spaced from each other.

4,004,588

APPARATUS FOR FLUSHING OVA FROM COWS OR MARES

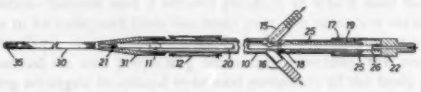
Alan Moana Alexander, Etchingham, England, assignor to Wrightson NMA Limited, Wellington, New Zealand

Filed Aug. 25, 1975, Ser. No. 607,673

Claims priority, application United Kingdom, May 21, 1975, 21920/75

Int. Cl.² A61M *1/00*

U.S. Cl. 128—241 **11 Claims**



1. Apparatus for use in flushing ova from mares or cows, such apparatus comprising an elongate member, inlet and outlet tubes defined in said elongate member, an expansible cuff adjacent one end of said member, a flexible conduit, one end of said conduit being removably attached to said one end of said member in communication with one of the tubes, an opening to said other tube between said cuff and said end of said member and a stylet passed through the said one tube and the flexible conduit whereby to stiffen said conduit.

4,004,589

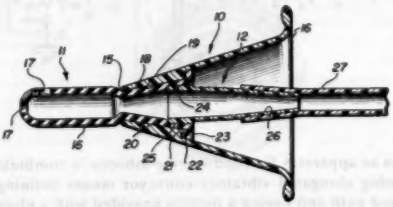
OSTOMY IRRIGATION APPARATUS

Erich Neumeier, Mosinee, Wis., assignor to Marsan Manufacturing Company, Inc., Wausau, Wis.

Filed Nov. 10, 1975, Ser. No. 630,351

Int. Cl.² A61M *3/00*

U.S. Cl. 128—245 **14 Claims**



1. An ostomy irrigating device comprising:

a truncated conical walled holder having a circular open top or apex and a circular bottom; and

a flexible elongated hollow round-nosed nozzle, separable from the conical walled holder, having a cylindrical front portion with at least one liquid dispensing orifice and a rear portion having an outwardly tapered part in contact with the conical walled holder about an interior tapered surface area adjacent the apex,

said nozzle front portion extending outwardly from the apex.

4,004,590

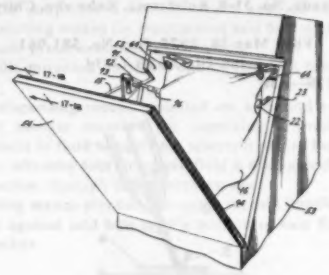
MEDICAL/SURGICAL SUCTION EQUIPMENT

Edward E. Muriot, Horsham, Pa., assignor to Health Technology Laboratories, Inc., Horsham, Pa.

Continuation-in-part of Ser. Nos. 524,052, Nov. 15, 1974, and Ser. No. 614,226, Sept. 17, 1975, which is a continuation of Ser. No. 497,838, Aug. 16, 1974, abandoned. This application Dec. 3, 1975, Ser. No. 637,140

Int. Cl.² A61M *1/00*

U.S. Cl. 128—276 **9 Claims**



1. Medical/surgical suction equipment comprising a vacuum chamber with a vacuum connection, the chamber having an opening with a notched wall at an edge of the opening, a door for closing said opening having a flat surface overlapping the wall notch, the door cooperating with the chamber wall to define a closed but openable vacuum compartment, a disposable and replaceable suction bag in the vacuum compartment for receiving body liquids, a disposable suction tube connected with the bag, at least a portion of the tube being flexible and extending through said notch to a point outside of the compartment for intake of body liquids, and a disposable vacuum sealing device surrounding and mounted on the tube, the sealing device having a flat surface for engagement with the flat surface of the door, having a portion configured to engage the notch of the chamber wall and further having a flange lying in a plane transverse to the tube and adapted to overlap the surface of the notched wall outside of the vacuum compartment, the bag, tube and sealing device being handleable as a disposable unit and being unitarily removable when the door is open.

4,004,591

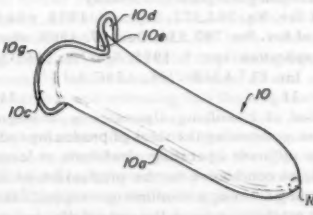
BIRTH CONTROL DEVICE

Max G. Freimark, 90870 Ferndale St., Philadelphia, Pa. 19115

Filed Nov. 17, 1975, Ser. No. 632,670

Int. Cl.² A61F *5/42*

U.S. Cl. 128—294 **7 Claims**



1. A contraceptive device to be worn internally by women comprising a generally tubular member made of an integral moisture proof membraneous compliant material and having an open end and a closed end, said tubular member having a cross-section dimensioned to fit snugly within the vaginal

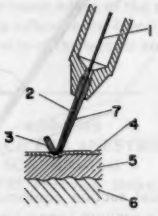
canal of the wearer, said cross section being substantially constant from said open end to a region adjacent said closed end, the open end of said tubular member having two flaps normally extending outwardly and generally transversely to the axis of said device, said flaps being contoured to cover the labia majora of the wearer and the epidermal area adjacent thereto.

4,004,592

ARTIFICIAL HAIR IMPLANTING METHOD

Shiro Yamada, No. 31-8, Koboyama, Kobo-cho, Chiryu, Aichi, Japan

Filed May 28, 1975, Ser. No. 581,961
Int. Cl.² A61B *17/34*
U.S. Cl. 128—330 **7 Claims**



1. A method of implanting an artificial hair into human tissue, comprising:

providing an implanting needle means having a point,

providing an artificial hair having a trunk portion of relatively great length and at one end an integral enlarged and elongated root having a tip end, said trunk portion integrally joining said root at a flexible neck,

grasping the neck of the root of said artificial hair with the point of said needle means and causing the root to fold back against said trunk,

thrusting said root into the epidermis with said needle until said root reaches the hypodermal tissue, the tip end of said root trailing said neck as said root passes into the tissue, and

withdrawing said needle whereby said root remains in the upper region of the hypodermal layer, with its tip end turned back an with said elongated root lying against the trunk portion extending from said neck, said hair being firmly fixed in position.

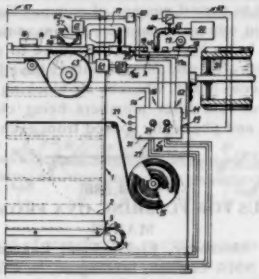
4,004,593

METHOD AND APPARATUS FOR CLASSIFYING CIGARETTES OR THE LIKE

Heinz Kaeding, Geesthacht, and Alexandros Nicolas, Wittenborg, both of Germany, assignors to Hauni-Werke Korber & Co., KG, Hamburg-Bergedorf, Germany

Division of Ser. No. 293,372, Sept. 29, 1972, which is a continuation of Ser. No. 787,536, Dec. 27, 1968, abandoned. This application Apr. 9, 1975, Ser. No. 566,336
Int. Cl.² A24B *7/14*; **A24C** *5/32*
U.S. Cl. 131—21 R **11 Claims**

1. A method of classifying cigarettes or analogous rod-shaped articles, comprising the steps of producing rod-shaped articles under different operating conditions at least one of which is at least conductive to the production of defective articles, including forming a continuous wrapped filler rod in a rod making machine, moving the rod axially, and subdividing the rod into sections of equal length at a first station whereby such sections constitute a series of discrete rod-shaped articles; transporting the articles of said series lengthwise along a predetermined path toward a second station; moving successive articles which reach said second station away from said second station; and removing from said path those articles which are produced while said one condition prevails, including subjecting each article to be removed to the expelling action of a gaseous fluid only when such article



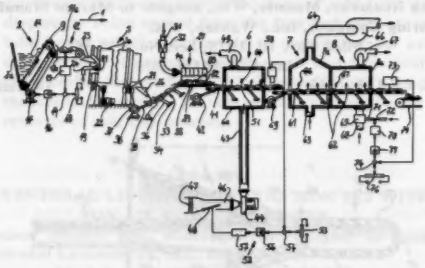
reaches a predetermined portion of said path, said expelling action of said gaseous fluid including moving the articles to be removed sideways from said predetermined portion of said path.

4,004,594

METHOD AND APPARATUS FOR CONDITIONING TOBACCO

Waldemar Wochnowski, Hamburg; Willi Thiele, Geesthacht; Reinhard Hohm, Pinneberg, and Herbert Schmidt, Glinde, all of Germany, assignors to Hauni-Werke Korber & Co., KG, Hamburg, Germany

Filed Dec. 19, 1974, Ser. No. 535,050
Claims priority, application Germany, Jan. 19, 1974, 2402538
Int. Cl.² A24B *9/00*
U.S. Cl. 131—135 **29 Claims**



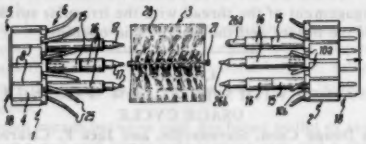
16. In an apparatus for conditioning tobacco, a combination comprising elongated vibratory conveyor means defining an elongated path and having a portion provided with a plurality of orifices in said conveyor means; means for supplying into said conveyor means a continuous stream of tobacco particles whereby said conveyor means transports the particles along said path and above said orifices; means for supplying to said orifices steam which issues from said orifices in the form of ascending currents; and means for regulating the pressure of steam in said steam supplying means so that said currents form a cushion which supports the particles of tobacco during transport by said portion of said conveyor means and that at least the major portion of steam issuing from said orifices condenses on and is entrained by tobacco particles beyond said portion of said conveyor means.

4,004,595

HAIR ROLLERS

Antoni Slavinski, 5 Avondale Drive, Holcombe Brook, Bury, Lancashire, England

Filed May 23, 1975, Ser. No. 580,684
Claims priority, application United Kingdom, May 28, 1974, 23652/74
Int. Cl.² A45D 2/00
U.S. Cl. 132—40 14 Claims



1. A hair roller comprising a body part having an axis, two axially spaced ends and an outer periphery around and in contact with which hair can be wound, and at least one retention member mounted at one said end of the said body part and movable axially relative thereto between a first position at which hair wound around the body part can be retained in position thereon and a second position at which said hair is free to be unwound from the body part, the retention member comprising a support structure and a plurality of prongs mounted on and projecting from said structure, the prongs being arranged to extend over said periphery of the body part in the said first position and being arranged to be retracted away from said periphery in the said second position, and the said prongs being arranged to be inclined outwardly away from said axis of the body part in the said first position, the body part comprising a cage structure and a brush member arranged within the cage structure having spines projecting out of same, the body part having end members and a plurality of elongated elements extending in side-by-side spaced disposition between the end members, each comprising two parts detachably interconnectable with each other at free ends thereof remote from the end members.

4,004,596

HAIR STYLING IMPLEMENT

Francis B. Hyland, Scituate, Mass., assignor to The Gillette Company, Boston, Mass.

Filed Mar. 3, 1975, Ser. No. 555,077
Int. Cl.² A45D 2/24
U.S. Cl. 132—37 R 6 Claims

1. Hair Styling apparatus comprising:

a first tubular member having a hair styling portion with first and second ends and a plurality of apertures there between;

a second tubular member having a plurality of nodules arranged in multiple rows and columns about a peripheral surface, said second tubular member being disposed within said first tubular member with said nodules contacting predetermined discrete points (on) substantially at extremities of said hair styling portion of said first tubular member to provide a uniform predetermined spacing between said first and second members and to transfer heat by conduction from said second member to said points on said first member to operate said first tubular member hair styling portion at a predetermined uniform surface temperature;

heat reservoir means attached to one end of said second tubular member;

heat generating means disposed within said second tubular member in heat transfer contact with said heat reservoir means and said second tubular member for heating said hair styling portion to said predetermined uniform surface temperature;

variable temperature control means coupled to said heat generating means for maintaining said hair styling portion at said predetermined temperature;

a handle mounted on a first end of said first tubular member;

fluid dispensing means mounted on a second end of said first tubular member for supplying a predetermined amount of fluid to said heat reservoir means for vaporization, whereby said vaporized fluid is discharged in a radial direction through said apertures; and

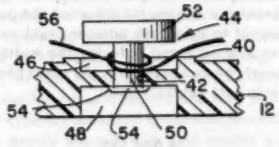
clamping means pivotally mounted on said handle to clamp hair against said hair styling portion of said first tubular member.

4,004,597

MEANS FOR SUPPORTING A STRIP OR LENGTH OF DENTAL FLOSS IN TENSIONED AND TAUT CONDITION FOR READY USE

Sam Kupperman, Chicago, and Dennis I. Kupperman, Glenview, both of Ill., assignors to RB Toy Development Co., Skokie, Ill.

Filed July 17, 1975, Ser. No. 596,736
Int. Cl.² A45D 44/18
U.S. Cl. 132—84 A 1 Claim



1. In combination a handle supporting a toothbrush at one end and means for supporting a precut strip or length of dental floss in position ready for use at the opposite end, said means comprising a forked member at the end of said handle and integrally formed with said handle, said forked member having a pair of spaced arms, with each of said arms having a longitudinal groove on one of the surfaces and a transversely extending groove on the undersurface, a depressable anchoring and locking member supported in an opening in said handle adjacent said forked member, said handle having a recess around said opening, said depressable anchoring and locking member having a head and a stem with the stem extending into said opening, a precut strip of dental floss having one end adapted to be manually wound around the stem of said anchoring and locking member and extending into the longitudinal groove of one arm and the groove on the undersurface and across to the other arm and extending into the transverse groove and longitudinal groove of said other arm, with the opposite end of said strip of dental floss adapted to be manually wound around the stem of said anchoring and locking member, said depressable anchoring and locking member adapted when moved axially into said opening to move said head into said recess and said stem further into said opening to tighten said strip of dental floss across the forked arms and lock the opposite ends of the strip against sliding on said anchoring and locking member, said stem having means to prevent removal of said stem from said handle, said forked member inclined at an angle of ap-

proximately 30° with respect to the longitudinal plane of the handle.

4,004,598

MACHINE FOR SEPARATING PIECES OF MONEY OR SIMILAR ARTICLES

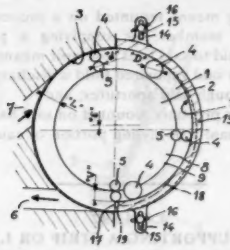
Nicolas Bezsilko, Tourcoing, France, assignor to S.A. Vandeputte Fils a Cie (department electronique Velec Sefat), Tourcoing, France

Filed Oct. 15, 1975, Ser. No. 622,603

Claims priority, application France, Oct. 15, 1974, 74.35052

Int. Cl.² G07D *3/00, 9/00*

U.S. Cl. 133—1 R **5 Claims**



1. A machine for handling pieces of money or similar items comprising a circular rotating path, a hollow vessel supporting said path for rotation, a fixed wall partially surrounding said path, an opening in said wall for supplying the pieces to be separated to the rotating path whereby the edges of the pieces roll along the wall under centrifugal force, an exit opening in the wall through which the pieces are discharged by centrifugal force to subsequent work positions, a band extending said wall adjacent said exit, means for adjusting the position of said band with respect to said path adjacent said exit, said band extending over said path and reducing the width of said path to support a single piece at said exit, the other pieces falling by their weight into said central zone.

4,004,599

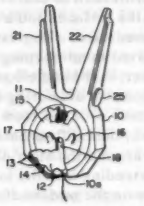
DENTAL FLOSS HOLDER

Marvin L. Rosenfeld, 602 Esplanade No. 205, Redondo Beach, Calif. 90277

Filed July 7, 1975, Ser. No. 593,192

Int. Cl.² A61C *15/00*

U.S. Cl. 132—92 R **3 Claims**



1. A dental floss holder including a member having a chamber for accomodating a removable holder carrying a thread of dental floss and provided with means for removing sections of the dental floss from the holder inside the chamber and supporting the removed sections in a taut manner external of the holder and spaced from external portions of the holder to permit the taut thread to be applied to the teeth of the user; the improvement wherein the member, holder, and the thread are interrelated such that upon tension being applied to the removed section of the thread, the thread itself locks the holder in position in the chamber and prevents further withdrawal or unravelling of thread from the holder, said improvement comprising an opening in the member leading from the chamber to enable removal of thread from the chamber, and an irregular surface portion provided on the holder in substantial alignment with said opening, said thread being compelled to interengage with said irregular surface portion in passing through said opening when external tension is applied to the thread, whereby said holder is thereupon locked and prevented from movement to unravel additional thread by the interengagement of the thread with the irregular surface portions of the holder and the wall of said opening.

4,004,600

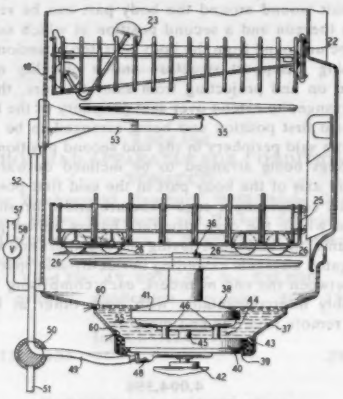
DISHWASHER WITH SPECIAL LOW WASHING LIQUID USAGE CYCLE

Adolph Duane Corn, Stevensville, and Jack F. Clearman, St. Joseph, both of Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Feb. 3, 1975, Ser. No. 546,525

Int. Cl.² B08B *3/02*

U.S. Cl. 134—57 D **1 Claim**



1. In an automatic dishwasher,

wall means forming a washing chamber and comprising a bottom wall configured to provide a depressed sump in the lower portion of said washing chamber,

first and second movable dish racks disposed in said washing chamber at successively different levels superjacent said sump,

an upper rotary spray arm positioned below the uppermost dish rack and positioned to direct a flow of washing and rinsing liquid from said spray arm upwardly against the dishware carried thereby,

a lower rotary spray arm positioned below the lowermost dish rack and positioned to direct a flow of washing and rinsing liquid upwardly against the dishware carried thereby,

a pumping assembly comprising

first and second pumps disposed in vertically stacked relation in said sump and further including a unidirectional electric motor positioned below said sump and having a power take-off shaft extending upwardly into said sump to form a common unidirectional rotary drive for said first and second pumps,

said first pump having a casing in the lowermost portion of said sump and having an outlet passage formed in said casing with an inlet port intersecting an upper wall of said casing and opening into said sump at a first lower level in said sump,

said casing having an outlet passage formed with a discharge outlet adapted to be connected to a conduit,

said second pump having a radial impeller formed with an axial inlet disposed at a second level in said sump above the level of said first inlet and an axial outlet opening directly coupled with said lower rotary spray arm,

said first and second pumps having pumping impellers of different pressure pumping capacity with the pumping impeller of said first pump constructed to discharge under a lesser increased pressure than the pumping impeller of said second pump thereby to provide a gentle reduced pressure washing action at the upper rotary spray arm for dishware in the uppermost dish rack,

water level control means for admitting water into the sump and including water sensing means disposed at said first level and at said second level to selectively vary the quantum of washing and rinsing liquid in the sump,

conduit means between said discharge outlet of said first pump and said upper rotary spray arm and a drainage outlet,

a two-way valve in said conduit means for selectively connecting said first pump to said upper rotary spray arm and said drainage outlet to drain,

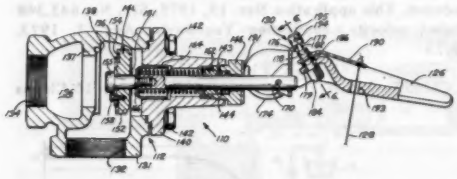
and sequence control means for automatically programming said dishwasher through a preselected series of washing and rinsing steps including a special glassware cycle wherein liquid level is limited to said first lower level and liquid at reduced pressure will be gently sprayed in said washing chamber only by said upper spray arm, the second pump being rendered inoperative by virtue of its associated inlet being disposed above the level of the liquid in the sump.

4,004,601

QUICK CLOSING EMERGENCY VALVE

Patrick Eugene Bachelder, Allen, and William David Sumner, Mc Kinney, both of Tex., assignors to Fisher Controls Company, Inc., Marshalltown, Iowa

Filed Oct. 2, 1975, Ser. No. 619,134
Int. Cl.² F16K *17/38*
U.S. Cl. 137—77 **17 Claims**



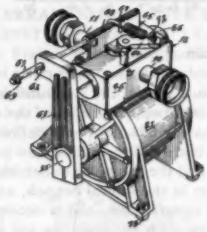
1. A quick closing emergency valve mechanism comprising valve body means having an inlet and an outlet, a fluid flow passage in said valve body means communicating said inlet and said outlet, a valve seat in said valve body between said inlet and outlet, valve means adapted to engage said valve seat for terminating fluid flow through said flow passage, said valve means comprising a valve and an elongated stem secured thereto and extending from the valve body, spring means for biasing the valve toward the valve seat, handle means pivotally secured to the stem, said handle means having a cam portion operable against the valve body means for actuating the valve away from the valve seat, cooperating latching means on the handle means and stem to retain the valve away from the valve seat, and release means actuated to release the cooperating latch means so as to permit the spring means to bias the valve to the valve seat to terminate flow through the fluid flow passage.

4,004,602

SELF-METERING DUAL PROPORTIONER

Nat Cordis, deceased, late of Silver Lake, Wis., and by Gladys S. Cordis, executrix, Chicago, Ill., assignors to Carl F. Jensen and Gerald T. Dobie, both of Rosemont, Ill., part interest to each

Continuation of Ser. No. 111,100, Jan. 29, 1971, abandoned, which is a continuation of Ser. No. 14,798, March 2, 1970, abandoned, which is a continuation of Ser. No. 738,764, June 7, 1968, abandoned, which is a continuation of Ser. No. 504,254, Oct. 23, 1965, abandoned, which is a continuation-in-part of Ser. No. 111,992, May 23, 1961, Pat. No. 3,213,873, which is a continuation-in-part of Ser. No. 152,204, Nov. 14, 1961, Pat. No. 3,213,796, which is a continuation-in-part of Ser. No. 380,695, July 6, 1964, Pat. No. 3,291,066. This application June 11, 1973, Ser. No. 368,619
Int. Cl.² G05D *11/03*
U.S. Cl. 137—99 **4 Claims**

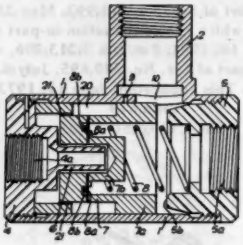


1. A unitary self-metering multifluid proportioning apparatus comprising constant displacement hydraulic motor means including a housing having first and second end walls; master piston means operating within said housing; a connecting rod carried by the master piston means and passing through the first end wall of the housing; constant displacement slave pump means carried by said second end wall and including a tubular pump cylinder mounted in the said second end wall; a slave plunger axially aligned with said master piston means and operating within said tubular pump cylinder; said slave plunger means being in driven association with said connecting rod; a water supply inlet and delivery conduit means connected to said housing; a water gating assembly on said housing interposed said water supply inlet and said motor means gating water to alternate sides of said master piston means operating within said housing; spring loaded lever means mounted on said water gating assembly and linked to a reversing rod; linkage means between the connecting rod and the said reversing rod whereby the reversing rod and the slave plunger follow the reversible motion of the master piston means; a flow control within said water gating assembly shifted by said spring loaded lever means; and slave pump check valve assembly means supported by the said second end wall and containing an inlet connection, and an outlet conduit means, said outlet conduit means discharging additive fluid directly into said delivery conduit means; and wherein said slave pump check valve assembly comprises a valve means carrying a plug on its upstream side and a self-centering, flow-through, double-coned coil spring on its downstream side, said double-coned spring having tapered end portions and an intermediate enlarged portion of maximum coil girth, and a ported bridge wall across the flow path through said slave pump check valve, a tapered recess on the upstream side of said bridge wall and terminating in a port therein, said tapered recess receiving and aligning the downstream cone end of said coil spring.

4,004,603
GAS VALVE MECHANISMS

Norman Stewart Jones, Leighton Buzzard, England, assignor to Pneupac Limited, London, England

Filed May 2, 1975, Ser. No. 574,097
Claims priority, application United Kingdom, June 4, 1974, 24786/74
Int. Cl.² F16K *15/02*; A61M *16/00*
U.S. Cl. 137—107 **8 Claims**



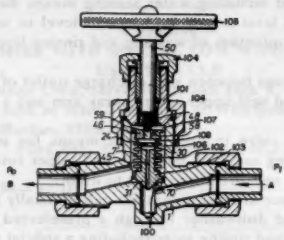
1. A valve mechanism comprising
a. a cylindrical body providing a gas pulse inlet, a gas pulse outlet, an exhaust outlet, the gas pulse inlet and the exhaust outlet being at opposite ends of the cylindrical body and the body having lateral branch defining the gas pulse outlet, and the body defining a first flow path between the gas pulse inlet and the gas pulse outlet, the first flow path including a port in the lateral branch, and the first flow path having a constriction, and a second, substantially unrestricted flow path between the gas pulse outlet and the exhaust outlet;
b. a valve element piston mounted for reciprocation in the body for movement in and controlling said flow paths between a first position wherein the valve element piston interrupts communication between the gas pulse inlet and outlet while opening substantially unrestricted communication between the gas pulse outlet and the exhaust outlet, and a second position wherein the valve element piston opens communication between the gas pulse inlet and outlet while interrupting communication between the gas pulse outlet and the exhaust outlet,
1. the valve element piston having a large effective area exposed to the gas pulse inlet and a gas pulse pressure at the inlet moving the valve element piston into the second position, and the piston closing the port in the first position and opening the port in the second position;
c. a spring loading the valve element to hold it in the first position and opposing the movement of the valve element into the second position; and
d. the constriction in the first flow path establishing a pressure differential acting on the valve element to oppose the spring loading in the second position.

4,004,604
METHOD OF AND APPARATUS FOR DRAINING CONDENSATE FROM A STEAM-CONTAINING SYSTEM

Hans Deinlein-Kalb, Frankenstrasse 81, Nurnberg, Germany

Continuation-in-part of Ser. No. 513,590, Oct. 10, 1974, abandoned. This application Jan. 5, 1976, Ser. No. 646,586
Int. Cl.² F16T *1/00*
U.S. Cl. 137—183 **3 Claims**

1. In a piping system supporting a pressure medium in the form of a gas or vapour, an apparatus for determining the pressure of a liquid in the pressure medium and automatically draining the same therefrom and being operative independently of the pressure and temperature of the pressure medium comprising:
a valve having a flow direction therethrough from an inflow to an outflow with a valve seat therebetween,
an axially-adjustable spindle,
a bush interengaged with the housing and threadedly engageable with the spindle opposite the valve seat,
a valve cone disposed between the valve seat and spindle and having a head seating on the valve seat and an elongated shank extendable away therefrom,
a resilient bellows fixed to the valve cone and circumscribing the valve cone shank in a spaced relationship defining a pressure chamber therebetween,
the valve cone having an axially-extending through bore,
a pressure plate fixed to the bellows and defining a gap between the valve cone shank and pressure plate,

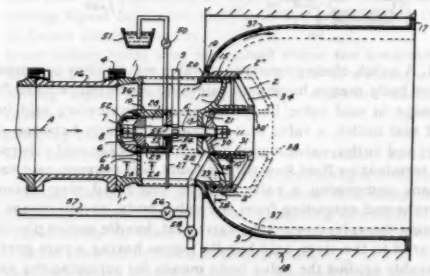


the valve cone having a narrow central throttle opening with the length thereof being a multiple of the diameter thereof,
the throttle opening communicating with a transverse opening leading to the pressure chamber between the bellows and shank,
the pressure plate having a central opening therethrough and a communicating relatively short throttle opening disposed obliquely to the outer end of the pressure plate leading to the gap between the valve cone shank and pressure plate,
the spindle having a conical tip extendable into the pressure plate through opening.

4,004,605
RELIEF VALVE FOR FLUIDS

Savo Rakcevic, Ljubljana, Yugoslavia, assignor to Titovi Zavodi Litostroj Ljubljana n.sol.o., Ljubljana, Yugoslavia

Continuation-in-part of Ser. No. 492,877, July 29, 1974, abandoned. This application Dec. 19, 1975, Ser. No. 642,348
Claims priority, application Yugoslavia, Aug. 2, 1973, 2100/73
Int. Cl.² F16K *31/124*
U.S. Cl. 137—219 **10 Claims**



1. A valve for controlling water under pressure and comprising:
a generally cylindrical housing having an axial flow passage extending along an axis and having an axial input end and an axial outlet end, said passage being axially traversed by

said water under pressure from said input end to said outlet end;

a front cylinder axially centered in said housing at said input end and defining in said housing a closed front chamber;

a pair of radially extending hollow ribs bridging said front cylinder and said housing to support said cylinder in said housing and having respective hollow interiors opening radially outside said housing;

a front piston in said front cylinder subdividing said front chamber into a front compartment toward said input end and a rear compartment toward said outlet end;

means for supplying oil under pressure through one of said hollow interiors to said rear compartment to displace said front piston axially toward said input end;

means for draining a fluid from said front compartment through one of said hollow interiors;

a fixed radially outwardly flared deflector mounted on said ribs at said outlet end and defining with said housing at said outlet end an outwardly opening outlet of larger diameter than said input end;

a rear cylinder mounted on said deflector and defining an axially rearwardly open rear chamber lying along said axis;

a rear piston axially displaceable in said rear chamber;

a rod lying on said axis and connected to both of said pistons for joint axial displacement thereof;

a cylindrical valve sleeve centered on said axis and carried on said rear piston, said sleeve closely surrounding said deflector and axially displaceable between a back position unblocking said outlet and a forward position blocking said outlet and preventing water flow through said passage;

an indicating member having an inner end secured to said rod and extending radially therefrom through one of said interiors outside said housing; and

means for supplying said water under pressure to said rear chamber in front of said rear piston to bias said sleeve toward said back position.

4,004,606

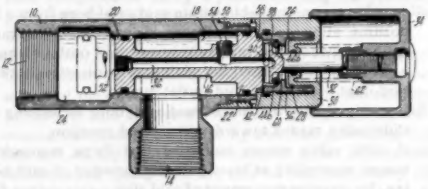
FLUSH VALVE

Earl W. Carson, 287 Hazard Ave., Enfield, Conn. 06082

Continuation-in-part of Ser. No. 487,711, July 11, 1974, Pat. No. 3,918,676. This application Oct. 9, 1975, Ser. No. 621,068

Int. Cl.² F16K *21/06, 31/12*

U.S. Cl. 137—271 **9 Claims**



1. A fluid valve including:

a valve body having a fluid inlet and a fluid outlet;

valve means in said valve body, said valve means being movable between a first position in which said fluid inlet is sealed from said fluid outlet and a second position in which said fluid inlet is in fluid communication with said fluid outlet;

control chamber means in said valve body for containing fluid to control the rate of movement of said valve means from said second position to said first position, said control chamber being defined in part by said valve means;

projection means extending from said valve means to said control chamber means;

sleeve means extending from said valve means into said control chamber means;

passage means in said valve means for delivering fluid from said inlet to said control chamber, said passage means including orifice means in said projection means;

compressible ring means for controlling fluid flow from said passage means into said control chamber means, said compressible ring means being located between said projection means and said sleeve means and being exposed on one side thereof to fluid pressure in said passage means and said ring means being exposed on the other side thereof to pressure in said control chamber said compressible ring means being compressed by a pressure differential thereacross to admit fluid from said passage means to said control means when said valve means is moved from said first position to said second position;

bleed means between said control chamber means and said passage means to bleed fluid from said control chamber means to said passage means; and

actuator means for actuating said valve means from said first position to said second position.

4,004,607

CONDUIT ARRANGEMENT WITH PROTECTION AGAINST RUPTURE AND LEAKAGE

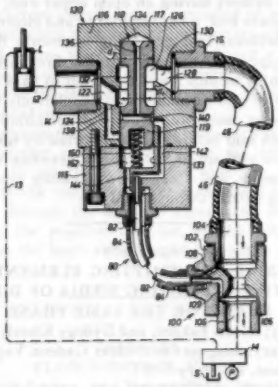
Lennart Werner Freese, Stalringen 20, 175 74 Jarfalla, Sweden

Filed Oct. 20, 1975, Ser. No. 623,712

Claims priority, application Sweden, Oct. 28, 1974, 7413556; Aug. 19, 1975, 7509247

Int. Cl.² F16K *31/12*

U.S. Cl. 137—486 **9 Claims**



1. A valve means for protecting conduit systems against unintentional depressurization, occurring for example when ruptures or leaks arise in the system, the device being applied for monitoring especially exposed sections of the system, e.g. a flexible hose incorporated therein, and arranged automatically to stop or block the flow through such a section for an undesired change in pressure occurring therein, characterized in that a stop or blocking valve (**20; 120**) is mounted at the inlet of the monitored section (**46**), said valve normally being open and hereby offering the medium flowing through a modest resistance generating a certain pressure drop (Δp_1, FIG. **3**), while a flow sensing means (**100**) of the kind wherein a medium flowing through produces a pressure drop (Δp_2) in response to the size of the flow, and for example comprising an orifice plate or venturi constriction (**105**), known per se, is placed at the outlet of the section (**46**), the blocking valve (**20; 120**) and the flow sensing means (**100**) communicating with a pressure comparator means (**50; 118**) which is arranged to compare the pressure drops (Δp_1 and Δp_2, respectively) across the blocking valve and the flow sensing means, and operative to cause the blocking valve (**20; 120**) to close

the flow into the conduit section (46) if the ratio ($\Delta p_2/\Delta p_1$) of the pressure drop over the flow sensing means (100) to that over the blocking valve (20; 120) falls below a certain value ($\Delta p_2'/\Delta p_1$).

4,004,608

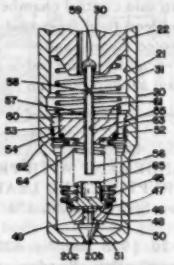
SUCTION THROTTLING VALVE

Arthur S. Kish, Lyndhurst, Ohio, assignor to Murray Corporation, Cockeysville, Md.

Division of Ser. No. 523,224, Nov. 13, 1974, Pat. No. 3,942,333. This application Nov. 13, 1975, Ser. No. 631,434

Int. Cl.² F16K *31/12, 31/36*

U.S. Cl. 137—510 **4 Claims**



1. A bellows assembly or unit for a suction throttling valve of the character described, comprising a housing provided with interior threads on its inner wall, said assembly or unit comprising a bellows having an open upper end, and a closed cup-shaped lower end, a nut secured to and closing said upper end of the bellows, said nut being exteriorly threaded, for threaded engagement with said interior threads whereby said bellows assembly or unit may be rotated to vary or adjust the axial position of said assembly or unit relatively to said housing, said bellows assembly or unit further comprising a stop member within said bellows and supported by said lower end, a compression coil spring interposed between said nut and said stop member, and a bellows evacuating tube secured to and extending axially through said nut.

4,004,609

MATERIAL TRANSMITTING ELEMENT FOR CONTACTING STREAMING MEDIA OF DIFFERENT PHASES OR THE SAME PHASE

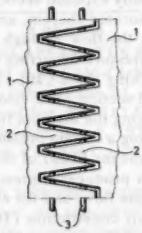
György Fábry; Istvan Takács, and György Kiszely, all of Budapest, Hungary, assignors to Richter Gedeon Vegyeszeti Gyar Rt., Budapest, Hungary

Division of Ser. No. 255,733, May 22, 1972, abandoned. This application Nov. 19, 1974, Ser. No. 525,216

Claims priority, application Hungary, June 3, 1977, RI 433

Int. Cl.² F16K *15/14*

U.S. Cl. 137—512.15 **2 Claims**



1. A fluid transmitting element for increasing vapor-liquid contact, said element having at least one flow opening therethrough, and a flow control member disposed in said opening, said flow control member comprising a resilient flat metal plate having a plurality of interfingering strips integral therewith, said strips being coplanar with each other and with said plate and spaced apart in their undeformed condition and defining between them a zigzag slot, said strips on each side of said slot having the configuration of a straight series of sawteeth.

4,004,610

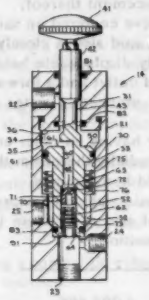
LINE CONTROL

Gerald F. Theriot, Houma, La., assignor to B.W.B. Controls, Inc., Houma, La.

Filed Apr. 14, 1975, Ser. No. 567,715

Int. Cl.² F16K *43/00*

U.S. Cl. 137—614.17 **2 Claims**



1. A control device adapted to be positioned intermediate a source of fluid under pressure and a valve actuator, said control device including:

a housing having an axial bore extending centrally thereof, said housing including fluid inlet means communicating with said axial bore, and fluid outlet means also communicating with said axial bore;

slide valve means movable within said axial bore from a first position allowing relatively unrestricted fluid communication between said inlet means and said outlet means to a second position blocking such communication between said inlet means and said outlet means;

first spring means, internal of said axial bore for biasing said slide valve means toward said second position;

said slide valve means including first force transmitting means, extending at least partially outward of said housing, for causing movement of said slide valve means from said second position to said first position;

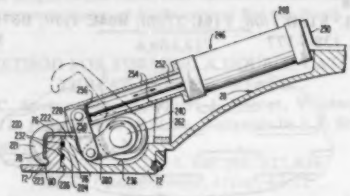
said slide valve means further including means for preventing said fluid under pressure from causing movement of said slide valve from said second position to said first position, and means for retaining said slide valve means in said first position against the biasing force of said first spring means, said retaining means including a piston portion having a fluid pressure receiving surface, for receiving said fluid under pressure thereagainst, said piston being sealingly engageable with the wall of said axial bore when said slide valve means is in said first position; and

check valve means, carried within an axial bore through a reduced diameter portion of said slide valve means, yieldably obstructing communication between said fluid inlet means and said fluid outlet means.

4,004,611
SWINGING SPHERICAL GATE VALVE AND DOUBLE SEAL QUICK DISCONNECT COUPLING

Morley V. Friedell, Wheat Ridge, Colo., assignor to Martin Marietta Corporation, New York, N.Y.

Division of Ser. No. 448,439, March 5, 1974, Pat. No. 3,902,694. This application June 2, 1975, Ser. No. 583,222
Int. Cl.² F16L *29/00*
U.S. Cl. 137—614 **4 Claims**



1. A double seal, quick disconnect fluid coupling comprising:

a pair of spherical gate valves including spherical housings terminating in axially extending cylindrical portions defining annular locating and locking interfaces for face to face confrontation,

one of said cylindrical portions forming a radially outwardly projecting seal clamp ring,

a plurality of cam lock clamps carried on the outer periphery of said other cylindrical portion at circumferentially spaced positions and extending longitudinally thereof,

each cam lock comprising a cam shaft including an eccentric portion rotatably supported on said housing cylindrical portion for rotation about an axis tangential to said housing and at right angles to the axis of said housing cylinder portion,

said clamp being hook-shaped and integral with and extending radially outward of said shaft eccentric portion and adapted to engage the side of said seal clamp ring opposite the confronting interfaces, and

actuator means for selectively rotating said cam shafts to move each clamp between open and closed positions,

said actuator means including; a pivot arm operatively coupled to said cam shaft and extending radially thereof, and

at least one reciprocating motor fixed to the outer periphery of said valve housing carrying said clamps and having a slide reciprocable along a path overlying the pivot arm pivot axis, and links pivotably coupled respectively to said slide and to said pivot arm,

and wherein, the length of said links and that of said arm, the position of said links relative to said slide and said arm, and the position of said arm relative to the eccentric portion of said cam shaft, are such that the eccentric is overcentered as determined by one line extending from the axis of the shaft to the contact point between the hook-shaped clamp and the side of said seal clamp ring and a second line extending from the shaft axis to the pivot coupling point between said links and said pivot arm and wherein said links are at right angles to the path of movement of said slide.

4,004,612
REMOTE CONTROL FOR LARGE-AREA SPRINKLER SYSTEMS

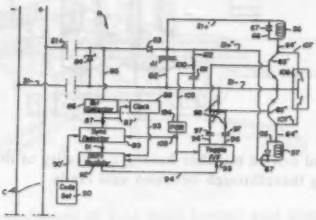
Frank Hummel, Jr., 817-14th St., Greeley, Colo. 80631, and Edmond B. King, Box 1781, Boulder, Colo. 80302

Filed Apr. 28, 1975, Ser. No. 572,104
Int. Cl.² A01G *25/16*
U.S. Cl. 137—624.11 **10 Claims**

1. A low-voltage, low amperage remote control system for operating a valve, or the like, which is controlled at a control station remote from the valve, said valve being hydraulically actuated and opens and closes responsive to fluid flow directed through opposing passageways in the valve, said system comprising, in combination therewith:

a. a latch valve at a hydraulically actuated valve connected with the aforesaid opposing passageways, said latch valve being shifted to a first position to direct fluid through one passageway to open the valve and to a second position to direct fluid through the other passageway to close the valve, said latch valve remaining at the position to which it is shifted until shifted to the other position;

b. two opposing solenoid means associated with the latch valve with one solenoid means operable to shift the latch valve to said first position responsive to a charge of current through the solenoid means and the second solenoid



means operable to shift the latch valve to said second position responsive to a charge of current through the solenoid;

c. direct current circuit means extended to each solenoid means including a charge-receiver means adjacent to the solenoid means to receive a charge, and a normally off electronic gate at each solenoid means to normally prevent flow of the charge from the charge-receiver means to the solenoid means; and

d. control circuit means extended from each electronic gate to a selective switching means at the control station adapted to selectively turn the gate on, whereby the charge at the charge receiver means will then produce current through the solenoid means and shift the latch valve to the position directed by the solenoid means whenever the latch valve is at the opposite position.

4,004,613
FLOW CONTROL VALVE

Robert Merrill Purton, and Robert Brent Maddock, both of Cerritos, Calif., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Sept. 9, 1975, Ser. No. 611,761
Int. Cl.² F16K *47/00*
U.S. Cl. 137—625.3 **6 Claims**

1. An improved, quiet, control valve comprising:

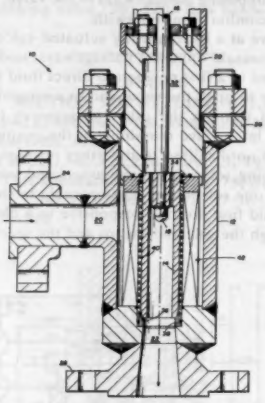
a hollow valve body having inlet and outlet passageways extending into said body, and having an annular valve seat encircling said outlet passageway;

a valve member movably positioned in said body and engageable with said valve seat to close said valve;

means on said body for moving said valve member; and,

flow control means in said body between said inlet and outlet passageways including annular means having a tortuous flow path therethrough and having an annular space therein forming the inlet to said flow path, said annular space being dimensionally narrower than any other portion of said flow path preventing flow therethrough of any particle sufficient in size to block said flow path, said annular means including means defining spaced, first and second radially disposed surfaces and also including an annular orifice member between said

surfaces having radially spaced annular lands, successive lands engaging one only of said first and second surfaces,



said orifice member having a plurality of orifices extending therethrough between said lands.

4,004,614

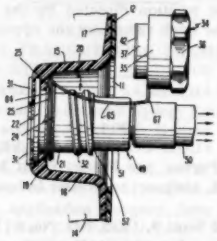
TETHER FOR CAPTIVE PLUG OF INFLATION DEVICE

Glenn H. Mackal, Ringwood; George E. Lardner, Hawthorne, and Joseph Maz, North Haledon, all of N.J., assignors to Halkey-Roberts Corporation, Paramus, N.J.

Division of Ser. No. 601,032, Aug. 1, 1975. This application Feb. 13, 1976, Ser. No. 657,726

Int. Cl.[2] A63H *3/06*; F16L *35/00*, *55/10*; F16K *15/20*

U.S. Cl. 138—89.2 5 Claims



1. In a device having a nipple and a closure member for the nipple which spans the opening therethrough, the application of the closure member to and its removal from the nipple involving rotation of the closure member relative to the nipple, the improvement which comprises a tether attaching the closure member to the nipple while permitting its removal therefrom, the tether being made of flexible plastic material in sheet form and having a circular body made substantially of two concentric rings spaced radially from each other, means rotatably securing the inner ring to the nipple inwardly of its outer free end and concentrically therewith, a radial tab connecting the two rings at one zone, a flexible strap connected at one of its ends to the outer edge of the outer ring at a second zone, such second zone being disposed diametrically opposite the first zone, the other end of the flexible strap being connected to the closure member.

4,004,615

PARTS SUBJECT TO WEAR IN SEPARATORS, CYCLONES, PIPELINES AND SIMILAR APPARATUS

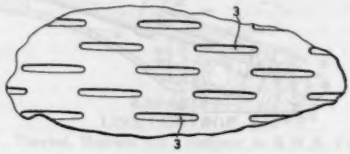
Hans Stern, deceased, late of Dortmund-Hochsten, Germany by Erika Stern, heir, and Werner Strauss, Bochum, Germany, assignors to Klockner-Humboldt-Deutz Aktiengesellschaft, Cologne, Germany

Filed Feb. 4, 1975, Ser. No. 547,044

Claims priority, application Germany, Feb. 4, 1974, 2405298

Int. Cl.[2] F15D *1/06*; F16L *57/00*; B04C *1/00*; B07B *4/00*

U.S. Cl. 138—177 8 Claims



1. In apparatus in which there is a particle-conducting flow, such as separators, cyclones, pipelines and similar apparatus, and where a part of said apparatus, designated wear members, is in contact with said particle-conducting flow and is abrasively worn by said particle-conducting flow, the improvement comprising a plurality of spaced depressions in said contact surface of said wear member producing an increase in the macro surface roughness above a roughness depth of 0.1 mm, of the wear member and forming a flow-marginal layer at the surface of the wear member spacing the abrasive particles in the flow from the surface of the wear member and in which layer entrained particles sink downwardly at reduced velocity with reduced abrasive effect.

4,004,616

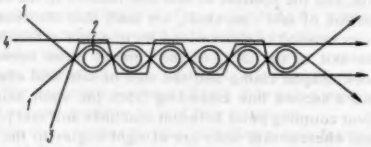
WOVEN BAND

Mikhail Alexandrovich Andronov, ulitsa Rusakovskaya, 39/43, kv. 32; Anatoly Nikolaevich Bakun, Sevastopolsky prospekt, 36, kv. 53; Felix Evgenievich Mezhevich, Rostokinsky gorodok, 6 linia, 17, kv. 84; Mikhail Ivanovich Petrov, Sevastopolsky prospekt, 17, korpus 2, kv. 39; Jury Ivanovich Belov, ulitsa 15 Parkovaya, 16, korpus 1, kv. 68, all of Moscow, U.S.S.R.; Alexandr Yakovlevich Feldman, deceased, late of Moscow, U.S.S.R., and by Raisa Alexandrovna Feldman, administratrix, ulitsa Bashilovskaya, 10, kv. 14, Moscow, U.S.S.R.

Filed June 18, 1974, Ser. No. 480,495

Int. Cl.[2] D03D *15/00*

U.S. Cl. 139—383 R 3 Claims



1. A woven band comprising a plurality of warp threads having different relative elongations at rupture and different colors; and weft threads interwoven with said warp threads, in which a plurality of a first group of warp threads, with a lesser relative elongation, are interwoven in a first zone beside each other and between the rest of a second group of warp threads, which are rarefied within said first zone, the warp threads uniformally passing about the weft threads uniformally passing about the weft threads forming essentially two indicator strips running warpwise, distinguishable against the rest of the band and having definitely, apparent, visual-discriminating-ability across the bandwidth, centers of said indicator strips being

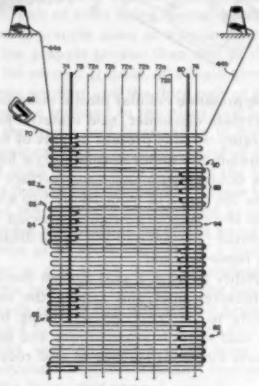
spaced from band side edges distances equalling from between one-eight to one-third the band width the ratio of the relative elongation of the threads of the indicator strips to the relative elongation of the warp threads being less than the ratio of the tensile force critical for the band strength to its actual rupture strength, so that as a result of which, an overload of the band involves simultaneous formation of clearly visible discontinuities of the indicator strips spaced apart at a constant pitch along the length of the band, said discontinuities being formed within a narrow range of loads critical for the band.

4,004,617

METHOD FOR FORMING A DOUBLE CATCH THREAD NARROW WEAVE

Junior C. Spence, Stuart; Robert J. Rorrer, Woolwine, and James L. Holt, Stuart, all of Va., assignors to J. P. Stevens & Co., Inc., New York, N.Y.

Filed Nov. 26, 1974, Ser. No. 527,438
Int. Cl.² D03D *23/00, 35/00, 47/02*
U.S. Cl. 139—416 **9 Claims**



1. A method of weaving a fabric comprising:
a. providing a plurality of warp threads to thereby form a first edge warp, a main warp and a second edge warp;
b. providing a first catch thread adjacent said first edge warp;
c. providing a second catch thread adjacent said second edge warp;
d. providing a first stop means at the boundry between said first edge warp and said main warp;
e. providing a second stop means at the boundry between said second edge warp and said main warp;
f. looping a shuttle thread around said first catch thread, drawing said first catch thread through said warp threads until said shuttle thread engages said second stop means, and looping said shuttle thread around said second edge warp to form an exterior shuttle thread loop about said second edge warp;
g. weaving said shuttle thread across said warps; and
h. looping said shuttle thread around said second catch thread, drawing said second catch thread through said warp threads until said shuttle thread engages said first stop means, and looping said shuttle thread around said first edge warp to form an exterior shuttle thread loop about said first edge warp.

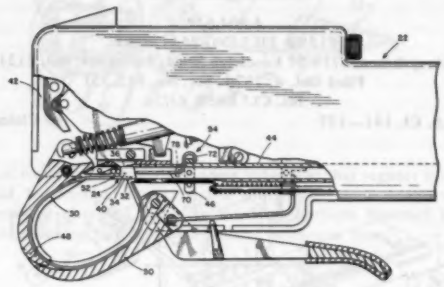
4,004,618

CABLE TIE BRAKING MEANS IN A CABLE TIE INSTALLATION TOOL

James A. Turek, La Grange, Ill., assignor to Panduit Corporation, Tinley Park, Ill.

Filed Dec. 29, 1975, Ser. No. 644,398
Int. Cl.² B21F *9/02*
U.S. Cl. 140—93.2 **10 Claims**

1. An improvement in a cable tie installation tool which includes a tool member for fastening a cable tie about a bundle of wires or the like, conveyor means connected to said tool member, and propulsion means for propelling a cable tie through said conveyor means to said tool member, said tool member having positioning means for placing said cable tie about said bundle, a tube receiving said cable tie from said conveyor means and guiding the tie toward said positioning means, and stop means engagable with the head of said tie for



limiting the movement of said head toward said positioning means, said improvement comprising:

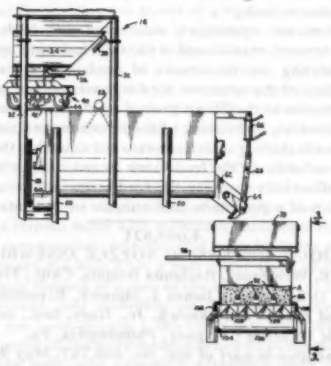
braking means for decelerating said cable tie as it passes through said tube and before the head of the tie reaches said stop means whereby the likelihood of damage to said head upon engagement with said stop means is reduced and the service life of said stop means is extended.

4,004,619

METHOD AND APPARATUS FOR PREPARING AND PACKAGING MASTIC COATING MATERIAL

Cecil A. Eddlemon, Gretna; Robert J. Harris, Marrero, and George E. Hanson, Belle Chasse, all of La., assignors to H. C. Price Co., Bartlesville, Okla.

Filed Apr. 28, 1976, Ser. No. 681,021
Int. Cl.² B65B *63/08*
U.S. Cl. 141—11 **16 Claims**



1. A method of simultaneously packaging a fluid, thermoplastic material in a plurality of containers when the material is initially present in bulk in a holding area, said method comprising the steps of:

positioning a plurality of said containers in side-by-side relationship beneath said holding area;

interposing a heating element in a vertical plane which extends upwardly between each adjacent pair of containers,

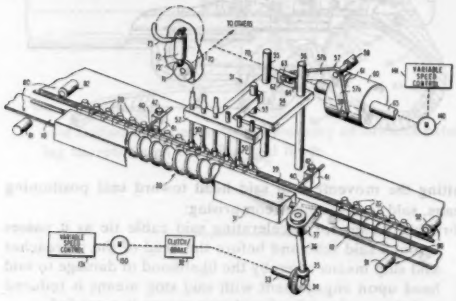
each of said heating elements also lying in a horizontal plane which is intermediate said holding area and the uppermost edges of said containers; and

passing the bulk material out of the holding area so said material can follow a path toward said containers, said material passing over said heating element as it travels said path thereby dividing itself into a plurality of individual masses equal to the number of containers and then passing into said containers.

4,004,620
FLUID FILLING MACHINE

Sidney Rosen, 4119-27 Fordleigh Road, Baltimore, Md. 21215

Filed Oct. 4, 1974, Ser. No. 512,351
Int. Cl.² B65B *43/56*
U.S. Cl. 141—137 19 Claims



1. A fluid handling and filling machine for filling containers with a predetermined amount of fluid, comprising

pump means,

nozzle means operatively connected with the pump means,

first means for actuating the pump means,

second means for raising and lowering the nozzle means,

indexing means for indexing a predetermined number of containers to be properly positioned in relation to the nozzle means to enable filling of the containers by said nozzle means, said indexing means including at least one rotatable feed screw means defining indexing spaces for the containers and operable, upon rotation, to move the containers, and

control means, operatively connected with both said first and second means and with said indexing means, for correlating the movement of containers by controlled rotation of the rotatable feed screw means of said indexing means to the filling thereof by said pump means and the lowering and raising of the nozzle means, said control means including counter means for counting the number of revolutions of the feed screw means, and further means for effectively stopping the feed screw means upon completion of a predetermined number of revolutions.

4,004,621
LIQUID-DISPENSING NOZZLE ASSEMBLY

Bernard E. Weidenaar, Hacienda Heights, Calif.; Frederick L. Voelz, Orland Park; James J. Simnick, Riverdale, both of Ill., and Peter P. Moskovich, Jr., Gary, Ind., assignors to Atlantic Richfield Company, Philadelphia, Pa.

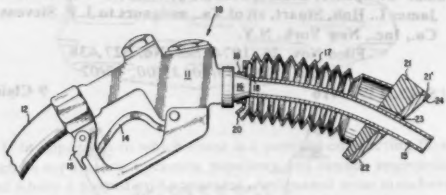
Continuation-in-part of Ser. No. 468,787, May 9, 1974, abandoned. This application Mar. 31, 1975, Ser. No. 563,906
Int. Cl.² B65B *3/04*
U.S. Cl. 141—392 13 Claims

1. A liquid dispensing nozzle assembly for delivery of liquid from a liquid source to a liquid receiver having a receiver inlet, said assembly being provided with means to allow for the removal of vapor during delivery of liquid to said receiver inlet from said source, said nozzle assembly comprising:

1. a liquid dispensing nozzle having a nozzle inlet, a nozzle housing and an elongated discharge spout adapted for insertion into said receiver inlet;

2. a vapor collector surrounding, in spaced relation thereto and forming a chamber therearound, the upper portion of said spout nearest said nozzle housing, said chamber being in fluid communication with the receiver inlet when said nozzle is inserted into said liquid receiver, one end of said vapor collector being sealed to said nozzle housing, or in proximity thereto, a sealant means carried by the other end of said vapor collector and having an exposed face for forming a surface seal against the outer surface of said receiver inlet, said spout extending beyond the other end of said sealant means; and

3. means for allowing removal of vapor from said chamber; the improvement comprising said sealant means comprising a compressible cellular plastic material obtained from a polyacrylate elastomer, said material having:



a. a plurality of cells present as part of its structure;

b. compressibility under normal nozzle loads of the material in contact with the outer surface of the receiver inlet in the range of from about 5 to about 85% of that part of the material's original preload volume;

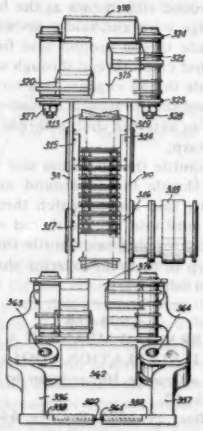
c. substantial resistance to the liquid dispensed and vapor being removed, and

d. the ability to form a seal against the outer surface of said receiver inlet and reduce the amount of vapor escaping to the atmosphere during liquid dispensing when said spout is inserted into and said exposed face contacts the outer surface of said receiver inlet.

4,004,622
HARVESTER PROCESSOR ASSEMBLY

Douglas D. Hamilton, Mount Royal, Canada, assignor to Logging Development Corporation, Montreal, Canada

Filed Dec. 30, 1974, Ser. No. 537,459
Claims priority, application Canada, Jan. 7, 1974, 189608
Int. Cl.² A01G *23/08*
U.S. Cl. 144—3 D 9 Claims



9. A combination tree felling head and processing assembly comprising:

a. a rigid longitudinally extending frame with a central, substantially U-shaped in cross-section, portion providing a pair of parallel plate members spaced apart from one another for receiving an endless belt type driven tree feed means;

b. a first grapple comprising a first pair of curved arms pivotally attached to said frame at one end thereof and protruding therefrom to receive and grasp the stem of a tree extending parallel to said frame, said arms each having a cutting edge for severing limbs from the stem of a tree loosely embraced by such arms as the tree is propelled endwise;

c. a second grapple and tree severing device mounted on the end of the frame opposite to that of said first grapple, said second grapple comprising a second pair of curved arms pivotally attached to said frame and protruding therefrom to receive and grasp the stem of a tree grasped by said first grapple at a position spaced therefrom, said tree severing device comprising a third pair of arms pivotally mounted on said frame at a position adjacent the pivotal mounting of the arms of said second grapple, the pivots for said third pair of arms being spaced behind the pivots for said second grapple arms at a distance from the tree grasped by the grapple greater than that of the pivots for the arms of the second grapple, all of said pivot axes being parallel to one another and the third pair of arms extending in a direction inclined to the pivot axis in a direction away from the frame and terminating in free outer end portions, a pair of cutting members secured to respective ones of said third pair of arms adjacent the free terminal end portions thereof and disposed in a plane transverse to the length of the stem of a tree grasped by said first and second grapples, said cutting members being disposed in such a position as to sever the stem of a tree grasped by said grapples at a position spaced therefrom longitudinally along the tree, power means for the respective pairs of arms of each of said first and second grapple and tree severing device for pivotally moving the same, said power means for the severing device comprising a hydraulic cylinder interconnecting the arms and disposed at a position below the frame and second grapple;

d. tree feed means mounted in said U-shaped portion of said frame at a position between said first and second grapples and comprising an endless conveyor extending longitudinally along the frame between said pair of plate members, said endless conveyor having formations thereon for tractively engaging the surface of the stem of a tree loosely grasped by said first and second grapples; and

e. a slide plate on said frame above and below said endless conveying means for slidably engaging the trunk of the tree as it is propelled endwise by said conveying means.

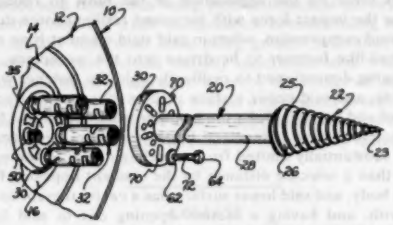
4,004,623

POWER TOOL

Russell H. Thackery, 2376 Brentwood Road, Columbus, Ohio 43209

Filed Apr. 19, 1976, Ser. No. 678,247
Int. Cl.² B27L 7/00; B60K 17/28
U.S. Cl. 144—193 R **4 Claims**

2. A power tool driven by a vehicle wheel hub comprising, in combination, a driven wheel hub; a plurality of fixed threaded elements on said hub; a plurality of removable threaded elements for normally attaching a wheel to the hub, each of said removable threaded elements being in threaded engagement with a respective one of the fixed threaded elements; a plurality of adapter means each of which is mounted to said hub by a respective pair of the threaded elements, each of said adapter means comprising a hollow body portion including a hub engaging end provided with a bore and an internal shoulder surrounding said bore, one of said threaded elements being extended through said bore whereby tightening of the elements clamps said shoulder and tightens the adapter on the hub, each of said adapters comprising a tool mounting end including side walls provided with slots and a longitudinal bore; a transverse bar removably disposed in said slots and including a central tool mounting threaded portion; a tool including a mounting base portion positioned on said



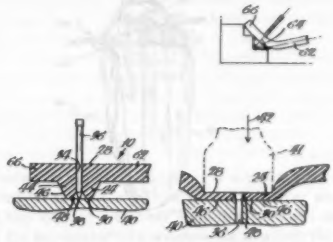
tool mounting ends and including base holes that register with said longitudinal bores; and a plurality of tool mounting threaded elements including threaded portions fastened to said threaded portions of respective transverse bars.

4,004,624

CARPENTER'S TOOL

Frederick W. Holstein, 1331 Howe St., Racine, Wis. 53403

Filed July 31, 1975, Ser. No. 601,313
Int. Cl.² B25C 3/00
U.S. Cl. 145—46 **3 Claims**



1. A tool for limiting the travel of a rigid element toward a workpiece when a hammer blow is applied to the element, said tool having a resilient, flexible body with an upper surface for receiving the impact force of a hammer blow, a lower surface for bearing engagement with the workpiece during the application of the blow, and an elongate hole extending through, and entirely surrounded by said resileint body between the upper and lower surfaces thereof for guiding the element during the application of the blow, said flexible body being compressed sufficiently in the direction parallel to that of the impact force by the application of the blow to resiliently oppose the impact force with increased resilient force during increased compression, wherein said body includes a portion tapered toward the hole from a part of the body adjacent the upper surface thereof to a part of the body adjacent the lower surface thereof, and including an elongated extension attached to the body having a thickness less than that of the tapered portion of the body measured in a direction parallel to the elongate hole, said extension extending away from the tapered portion in a substantially radial direction with respect to the hole, said extension defining an angle relative to the elongate axis of the hole and being resiliently flexible whereby the angle may be manually altered.

3. A tool for limiting the travel of a rigid element toward a workpiece when a hammer blow is applied to the element, said tool having a resilient, flexible body with an upper surface for receiving the impact force of a hammer blow, a lower surface for bearing engagement with the workpiece during the appli-

cation of the blow, and an elongate hole extending through, and entirely surrounded by, said resilient body between the upper and lower surfaces thereof for guiding the element during the application of the blow, said flexible body being compressed sufficiently in the direction parallel to that of the impact force by the application of the blow to resiliently oppose the impact force with increased resilient force during increased compression, wherein said rigid element is an elongate nail-like fastener to be driven into the workpiece, said hole being dimensioned to resiliently hold the fastener within the hole, and said upper surface is the upper most surface of the tool and engageable by the hammer when the impact force of a hammer blow is received by the fastener, said hammer being substantially limited from traveling closer to the workpiece than a selected distance by the resilient opposing force of the body, and said lower surface has a cavity therein co-axially with, and having a section opening out to said lower surface and with a transverse dimension greater than and below, the hole, said section of the cavity having a depth substantially equal to but slightly greater than said distance, whereby the hold on the element exerted by the hole is released when the element protrudes from the workpiece by an amount equal to said distance.

4,004,625

CONTAINER FOR ANCHOR AND LINE

John F. Zietlow, Jr., 37 Berkley Place, Buffalo, N.Y. 14209

Filed Nov. 3, 1975, Ser. No. 627,971
Int. Cl.² B65D *33/24*
U.S. Cl. 150—7 **11 Claims**

1. A container for stowing an anchor and a length of line connected thereto, said container comprising:

a. a hollow body portion of flexible material closed at one end and open at the other, said body portion having an interior region communicating with said open end and being of sufficient size to accommodate said anchor;

b. means defining a plurality of pockets of flexible material in spaced relation along and around said body portion, each of said pockets having a hollow body portion closed at one end and open at the other end thereof adjacent said open end of said container body portion, each of said pockets having an interior region and the aggregate size of the interior regions of said pockets being of sufficient size to accommodate said line; and

c. a movable closure element of flexible material on said open end of said body, said closure element comprising a pair of flaps integral with said body portion and foldable into a closed position over said open end of said container body portion, said closure element being movable from a position covering the open ends of said container body portion and said pockets when said anchor and line are stored therein to an open position allowing said anchor and line to be removed from the container for use;

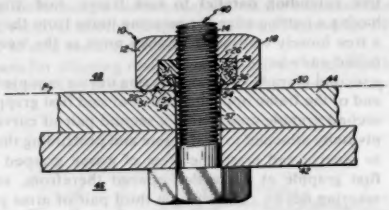
d. whereby said anchor can be stowed in the interior of said container body portion and said line can be stowed cumulatively in said pockets in a manner preventing fouling thereof and when said anchor is removed from said container for use said line can be payed out sequentially in a manner preventing fouling thereof.

4,004,626

SELF-SEALING, SELF-LOCKING THREADED FASTENER

Daniel L. Biblin, Morris Township, and Joseph R. Preziosi, Clark, both of N.J., assignors to Amerace Corporation, New York, N.Y.

Filed June 6, 1975, Ser. No. 584,475
Int. Cl.² F16B *39/24*
U.S. Cl. 151—7 **6 Claims**



1. A self-sealing, self-locking fastener comprising:

a unitary metallic nut body including an internally threaded portion, the thread having a root of prescribed diameter and an axis, and an immovable plane annular clamping surface surrounding and perpendicular to the axis and axially spaced and facing away from said threaded portion and in and defining a clamping plane;

an annular recess in the nut body generally coaxial with the threaded portion, said recess having an inside surfaces located outside the envelope of the root of the thread and facing the thread axis and extending axially from said threaded portion toward the clamping plane, no part of said nut body being radially between said inside surface and the thread axis;

said nut body further having compression-retention means unitary with the threaded portion and having a radially inwardly extending deformable annular flange surrounding the axis and having a first surface facing said threaded portion and merging with said inside surface of said recess, a second surface facing away from said threaded portion and closer to the axis than said immovable plane annular clamping surface, said plane clamping surface and said second surface of said flange being joined by a groove, facilitating deformation of said flange, and an annular third surface confronting the axis and joining said first and second flange surfaces to provide said flange with an inner diameter, when said fastener is fully seated on a workpiece, slightly greater than said root diameter, and said second surface initially extending beyond the clamping plane in the axial direction away from the threaded portion;

and an annular member of resilient sealing and locking material, such as a fluoroplastic, retained within the recess between said threaded portion and said first surface of said flange, said annular member having an inside surface adapted for free initial reception of a complementary threaded element and having a portion of initial diameter no smaller than approximately said root diameter and extending axially from said threaded portion toward the clamping plane;

whereby, upon engaging the fastener with the complementary threaded element passing through a hole in the workpiece and tightening the flange against the workpiece, axial clamping force exerted by the workpiece on said second surface of the flange will deform said flange axially toward said threaded portion until said second surface of said flange is in the clamping plane, thereby compressing the annular member axially between said first surface of said flange and said threaded portion while contracting the inside surface thereof to establish a seal along, and locking relationship with, the complementary threaded and forcing material of the annular member against the workpiece in an annular space between the flange and the complementary threaded element to estab-

lish a seal between the annular member and the workpiece.

4,004,627

PNEUMATIC TIRE WITH SIDEWALL COMPOSITION

Paul H. Sandstrom, Tallmadge, and Joginder Lal, Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Dec. 19, 1975, Ser. No. 642,273
Int. Cl.² C08F 15/06; C08G 20/20
U.S. Cl. 152—355 **20 Claims**

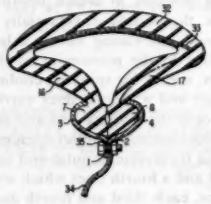
1. A pneumatic rubber tire which comprises a generally toroidal shaped carcass with a circumferential tread, shaped beads and connecting sidewall portions extending between said tread and beads and having adhered to said sidewall portion an adherent, covulcanized outer rubbery sidewall layer extending from the general area of said bead portion towards said tread, where said rubbery sidwall layer is an elastomeric composition comprised of (A) about 10 to about 40 phr rubbery EPDM, (B) about 0 to about 20 phr of a rubbery polymer prepared from at least one $C_4 - C_{10}$ α-olefin interpolymerized with at least one $C_5 - C_{20}$ nonconjugated polyene containing 2 or more carbon to carbon double bonds, (C) about 55 to about 80 phr of high unsaturation rubbers comprised of 30 to 80 weight percent natural rubber and (D) about 0.5 to about 10 phr of at least one compound additive selected from the group consisting of triallyl cyanurate, mono- and bis-maleimides selected from maleimide, N-ethylmaleimide, N-phenylmaleimide, N-trichloromethylmaleimide, N-4-carboxyphenylmaleimide, N,N′-thiobismaleimide, N,N′-dithiobismaleimide, and N,N′-phenylenebismaleimide, and anhydrides selected from isatoic anhydride, N-methyl isatoic anhydride, phthalic anhydride, succinic anhydride and maleic anhydride.

4,004,628

PNEUMATIC WHEEL FOR MOTOR VEHICLES

Giorgio Tangorra, Monza (Milan), and Giovanni Calori, Milan, both of Italy, assignors to Industrie Pirelli S.p.A., Milan, Italy

Filed Feb. 28, 1975, Ser. No. 554,190
Claims priority, application Italy, Mar. 4, 1974, 48941/74; Oct. 4, 1974, 28039/74
Int. Cl.² B60C 5/12
U.S. Cl. 152—383 **19 Claims**



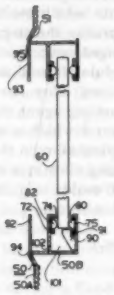
1. A pneumatic wheel for motor vehicles comprising a rim and a pneumatic tire with a tread reinforced by an annular inextensible structure, two sidewalls having their own section midline in the meridian plane with its convexity directed towards the inside of the tire and such that in consequence of te inflation air they are subjected to combined bending and compression stresses, said sidewalls terminating in two beads connecting the pneumatic tire to the rim, said rim having at least one seat having the shape of a circumferential channel with an opening directed in a radially outer direction with respect to the axis of rotation of the pneumatic wheel, the radially outermost ends of said rim being directed towards the midline of the pneumatic wheel to constitute said opening, the width of said opening being smaller than the maximum width of said seat, said beads having a size with respect to said seat which adapts them to be subjected to an axial compression, said beads having respectively two circumferential surfaces axially facing each other, each surface having a first radially innermost zone and a second radially outermost zone, the axial distance, when the beads are not locked in the rim seat, between said first zones being smaller than that between said second zones, the axial compression corresponding to said first radially innermost zone being greater than that corresponding to said second radially outermost zone when the beads are locked in said seat, whereby the center of the axial thrust of the beads is radially inward with respect to that which would be obtained if the axial compression were uniformly distributed on said circumferential surfaces axially facing each other.

4,004,629

FRAMELESS SLIDING WINDOW ASSEMBLY

Donald V. Kelly, 10642 Helendale, Tujunga, Calif. 91042

Filed Oct. 9, 1974, Ser. No. 513,296
Int. Cl.² E06B 3/32; E05D 15/06
U.S. Cl. 160—90 **7 Claims**



1. A window assembly comprising a window frame including as members thereof a pair of jambs, a header and a sill;
at least two of said members including portions defining a track for movement of a window lite to affect the opening and closing of the window assembly;
a window lite positioned in the track of said frame;
the sill portion including a longitudinally extending member in said track in elongated supporting contact with the edge of said lite and a recess below and lite;
handle means engaging said lite for movement within said frame;
seal means supported by said frame and extending along the surfaces of said frame portions in a sealing relationship with said lite;
said supporting member extending only partially across the thickness of said track leaving said recess unobstructed on the outer or weather side of said lites except for said seal means whereby foreign material including moisture contacting said lite and passing said seal means can drop below said lite into said recess;
said sill portion further defining drainage openings therein communicating between said recess and the exterior of the assembly;
wherein said handle means includes a portion extending into engagement with one of said track defining portions of said assembly when said window is in a closed position whereby said lite is mechanically biased against said seal means of said assembly;
wherein said handle includes a wedge-shaped foot portion extending generally parallel to the inner surface of said lite whereby said foot portion extends between said lite and frame when said lite is closed thereby mechanically wedging said lite against said seal means.

4,004,630

PROCESS FOR THE MANUFACTURE OF CAST IRON

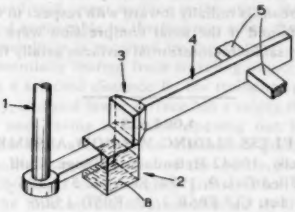
Clifford Matthew Dunks, East Grinstead, England, assignor to Materials and Methods Limited, England

Filed Apr. 28, 1975, Ser. No. 571,621

Claims priority, application United Kingdom, Apr. 29, 1974, 18657/74

Int. Cl.² B22D 27/20

U.S. Cl. 164—57 2 Claims



1. A method for the production of the nodular graphite cast iron castings in a mold into which molten grey iron is introduced, said method comprising the steps of:

a. determining the required concentration of a nodularizing agent required to nodularize said molten grey iron;

b. selecting a nodularizing alloy having a predetermined percentage of nodularizing agent therein and a predetermined efficiency factor k which is a function of the solubility of the nodularizing alloy in the molten grey iron;

c. placing the nodularizing alloy into at least one intermediate chamber in said mold, said intermediate chamber having a base area A wherein

$$A = 1/k\ (W_T/T)\ (N_{nod}/W_T)$$

where

W_T/T = pouring rate of the molten metal into the mold

N_{nod}/W_T = required concentration of nodularizing agent

d. pouring said molten grey iron into said mold wherein said nodularizing agent is taken into solution in said molten grey iron, as said molten metal passes over the nodularizing agent in said intermediate chamber, whereby the graphite in said molten grey iron is converted to a nodular form such that a nodular cast iron casting is formed.

4,004,631

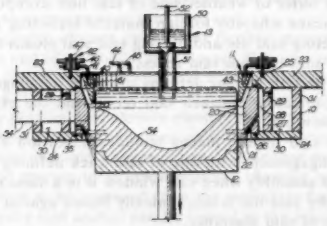
ELECTROMAGNETIC CASTING APPARATUS

David G. Goodrich, San Ramon, and Ludwig John, Pleasanton, both of Calif., assignors to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.

Filed July 28, 1975, Ser. No. 599,744

Int. Cl.² B22D 27/02

U.S. Cl. 164—250 8 Claims



1. In an electromagnetic apparatus for the continuous or semicontinuous casting of metal ingots or billets, wherein a solid ring-type metallic electromagnetic inductor is provided to generate electromagnetic forces which control the shape of a column of molten metal disposed within the inner peripheral area of the inductor and wherein a coolant source is disposed around said metal column to direct coolant onto the surface of the metal so as to cause the solidification thereof, the improvement comprising an annular coolant jacket as said coolant source with the solid ring-type metallic electromagnetic inductor disposed immediately adjacent the column of molten metal as the inner wall of the annular coolant jacket with the inner peripheral area of the inductor exposed to the column of molten metal, the inductor thereby defining in part a coolant chamber within the coolant jacket so that the inductor is cooled by the coolant in the chamber.

4,004,632

CENTRIFUGAL CASTING MACHINE CASING AND COOLING APPARATUS

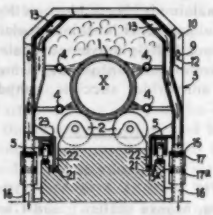
Pierre Henri Marie Fort, Nancy, and Michel Pierrel, Pont-a-Mousson, both of France, assignors to Pont-A-Mousson S.A., Nancy, France

Filed Apr. 11, 1975, Ser. No. 567,334

Claims priority, application France, Apr. 29, 1974, 74.14868

Int. Cl.² B22D 13/02

U.S. Cl. 164—297 8 Claims



1. A machine for centrifugally casting iron pipes comprising support means, a casing, a rotary casting mould supported on the support means and rotatable about an axis, the casing being movable in translation in a direction parallel to said axis relative to the support means between a withdrawn position and an operative position in which operative position the casing surrounds the mould substantially throughout the length of the mould, the casing having a leading end and a trailing end relative to the movement of the casing to said operative position, means for spraying cooling water onto the mould, a first duct and a second duct carried by the casing respectively adjacent the leading end and the trailing end of the casing, each duct having an outlet opening onto the interior of the casing and a transverse annular end surface defining an inlet, a third duct and a fourth duct which are fixed relative to the support means, each third and fourth duct having a transverse annular end surface defining an outlet, and forced steam suction means disposed in the third and fourth ducts, the end surfaces of the first and second ducts being respectively parallel to the end surfaces of the third and fourth ducts and positioned relative to the casing to respectively coincide with and sealingly engage the end surfaces of the third and fourth ducts in the operative position of the casing, the end surfaces of the ducts being inclined relative to said axis in a direction to permit the end surfaces of the first and second ducts to disengage from the end surfaces of the third and fourth ducts when the casing moves to said withdrawn position, and the end surfaces of the first and third ducts being offset transversely of said axis from the end surfaces of the second and third ducts whereby the end surface of the first duct clears the end surface of the fourth duct when the casing moves to said withdrawn position.

4,004,633

BRICK CONSTRUCTION FOR HORIZONTAL REGENERATOR

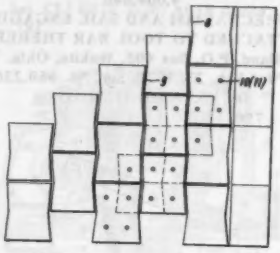
Wolfgang Cronert, Eikamp, Germany, assignor to Martin & Pagenstecher GmbH, Cologne, Germany

Filed Dec. 9, 1974, Ser. No. 531,024

Claims priority, application Germany, Dec. 13, 1973, 441153[U]

Int. Cl.² F28D 17/00

U.S. Cl. 165—9.1 11 Claims



1. In a horizontally disposed regenerator having a plurality of generally parallel courses of bricks separated by vertical spacers, each course of which runs generally horizontal, the improvement wherein the bricks have a generally slab-like horizontal surface, wherein the longitudinal sides of said slab-like surface of said horizontal brick are provided with a tooth-like formation engaging in an offset manner the tooth-like formation of an adjoining horizontal brick in the same horizontal plane whereby said horizontal bricks are offset from one horizontal row to another horizontal row as the adjoining bricks are engaging one another in offset position the vertical spacers run generally longitudinal of said slab-like surfaces between courses thereof, said vertical spacers engaging the slab-like surfaces by a tongue and groove connection.

4,004,634

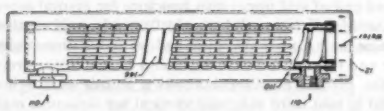
AUTOMOTIVE OIL COOLER

Edward P. Habdas, Dearborn Heights, Mich., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed May 6, 1975, Ser. No. 574,989

Int. Cl.² F28D 7/10

U.S. Cl. 165—155 10 Claims



1. In a submerged oil cooler for automotive vehicles comprising a hollow inner length of tubing through which engine coolant may flow and an outer length of tubing sealed at its ends to the inner tubing and having an inner surface which cooperates with the outer surface of the inner length of tubing to define a generally annular flow passage for oil which may pass through inlet and outlet fittings at opposed ends of the cooler, the improvement wherein said inner length of tubing includes a helically convoluted outer surface and said outer length of tubing includes a plurality of generally axially extending flutes which engage said helically convoluted outer surface, the crests of said flutes being periodically transversely indented along the axial length thereof to a depth less than the depth of the flutes.

4,004,635

METHOD FOR CONNECTING A SUBMERGED WELL HEAD TO A PIPE CONSISTING OF STEEL TUBES

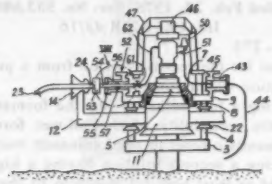
Roger Andre Marie Marquaire, La Celle St. Cloud; Michel Georges August Curtis, Lyon, both of France, and Robert Edouard Schappel, London, England, assignors to Subsea Equipment Associates Limited, Hamilton, Bermuda

Filed Apr. 7, 1975, Ser. No. 565,908

Claims priority, application France, Apr. 5, 1974, 74.12174

Int. Cl.² E21B 33/035

U.S. Cl. 166—.6 12 Claims



1. A method of connecting a relatively inflexible outflow pipe to a submerged well head at a depth which may be greater than that which can be reached by a diver, the method comprising the steps of; attaching a pipe connector at the surface to an end of said outflow pipe; locking said pipe connector onto a placing structure fixed relative to said well head; lowering a diving bell onto said well head, said diving bell being provided with a bearing structure which is connected to said well head to thus render watertight the volume formed by said well head, said structure and said bell; the orientation of said bell and said bearing structure being chosen as a function of the orientation of said pipe connector relative to said well head; attaching to said well head a sub-assembly coupled to the lining of said well head; connecting said sub-assembly to a device for automatic connection to said pipe connector, which automatic connection device is fixed to said bearing structure; and automatically connecting said device to said pipe connector.

4,004,636

COMBINED MULTIPLE SOLVENT AND THERMAL HEAVY OIL RECOVERY

Alfred Brown; Ching H. Wu, and Daniel T. Konopnicki, all of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Filed May 27, 1975, Ser. No. 580,863

Int. Cl.² E21B 43/22, 43/24

U.S. Cl. 166—272 26 Claims

1. A method for recovering viscous petroleum including bitumen from a subterranean, viscous petroleum-containing, permeable formation including a tar sand deposit, the formation having a petroleum saturation below 50%, the formation being penetrated by at least two wells in fluid communication therewith, comprising:

a. introducing a solvent which is gaseous at formation temperature and pressure, into the formation via the first well until the pressure in the formation exceeds the vapor pressure of gaseous solvent at formation temperature so said gaseous solvent exist essentially all in the liquid phase in the formation;

b. introducing a solvent which is liquid at formation temperature and pressure, into the formation via the first well;

c. thereafter reducing the pressure in at least a portion of the petroleum formation contacted by the solvents to a value greater than the vapor pressure of the solvent mixture;

d. recovering a solution of the petroleum and solvent from the formation via at least one of said wells, maintaining the formation pressure greater than the vapor pressure of the solvent mixture; and finally

e. injecting a fluid heated to a temperature substantially

greater than the boiling temperature of the gaseous solvent into the formation via the first well while recovering petroleum and solvent from said second well.

4,004,637

OIL RECOVERY BY IMPROVED SURFACTANT FLOODING

Riley B. Needham; Gilbert R. Glinsmann, and Donald R. Wier, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Feb. 27, 1975, Ser. No. 553,689
Int. Cl.² E21B *43/16*
U.S. Cl. 166—273 **12 Claims**

1. A process for the recovery of oil from a predominantly oil-wet formation which comprises:
   a. introducing a first solution into the formation so as to change the wettability of the oil-wet formation from predominantly oil-wet to predominantly water-wet;
   b. introducing a second solution having a high interfacial tension of at least about 1 dyne/cm to the oil into the formation;
   c. introducing a third solution having a low interfacial tension of not more than 0.02 dyne/cm to the oil into the formation;
   d. introducing a driving fluid into the formation to drive said first, second and third solutions and oil from said formation; and thereafter
   e. recovering the oil.

4,004,638

OIL RECOVERY BY ALKALINE-SURFACTANT WATERFLOODING

Ralph F. Burdyn; Harry L. Chang, and Evin L. Cook, all of Dallas, Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Apr. 23, 1975, Ser. No. 570,686
Int. Cl.² E21B *43/22*
U.S. Cl. 166—273 **18 Claims**

1. In the recovery of oil from a subterranean oil reservoir penetrated by spaced injection and production systems, said reservoir containing oil having an acid number within the range of 0.1 to 1.0, the method comprising:
   a. injecting into said reservoir via said injection system an aqueous initiation slug containing an alkaline agent selected from the group consisting of alkali metal and ammonium hydroxides to neutralize organic acids in said reservoir to surface-active soaps,
   b. thereafter injecting into said reservoir via said injection system an aqueous surfactant slug containing a sulfonate surfactant and an alkaline agent selected from the group consisting of alkali metal and ammonium hydroxides,
   c. thereafter injecting into said reservoir via said injection system an aqueous flooding medium to displace oil to said production system, and
   d. recovering oil from said production system.

4,004,639

SELECTIVELY PLUGGING THE MORE PERMEABLE STRATA OF A SUBTERRANEAN FORMATION

Burton B. Sandiford, Placentia, Calif., assignor to Union Oil Company of California, Brea, Calif.

Filed Mar. 17, 1976, Ser. No. 667,693
Int. Cl.² E21B *33/138*, *43/22*
U.S. Cl. 166—292 **15 Claims**

1. A method for reducing the permeability of the higher permeability strata or channels of a heterogeneous subterranean formation penetrated by a well comprising sequentially injecting the following fluids through the said well and into the said formation:
   a. about 1 to about 100 barrels per vertical foot of strata to be treated of an aqueous solution of a relatively high concentration of a gelling agent for alkali metal silicate;
   b. about 2 to about 200 barrels per vertical foot of strata to be treated of an aqueous solution of an alkali metal silicate and a relatively low concentration of a gelling agent for said alkali metal silicate; and
   c. about 1 to about 100 barrels per vertical foot of strata to be treated of an inert aqueous spacer liquid;

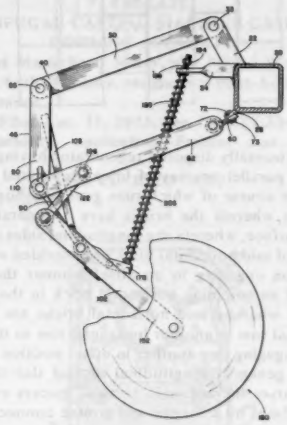
solutions (a) and (b) being injected in any order and solution (c) being injected between said solutions (a) and (b).

4,004,640

HANGER MECHANISM AND SAIL ENGAGING TOOL ATTACHED TO TOOL BAR THEREBY

Charles W. Bland, P.O. Box 405, Wakita, Okla. 73771

Filed Feb. 23, 1976, Ser. No. 660,226
Int. Cl.² A01B *61/04*, *65/06*
U.S. Cl. 172—710 **5 Claims**



1. In the combination of a horizontal tool bar and a soil engaging tool connected thereto by a hanger mechanism, the improvement wherein the hanger mechanism comprises an upper arm structure pivotally attached at one end to said tool bar for pivotal movement about a first axis parallel to said tool bar, said upper arm structure extending forward away from said tool bar and terminating at a forward end, a lower arm structure pivotally attached at one end to said tool bar for pivotal movement about a second axis parallel to and below said first axis, said lower arm structure extending forward away from said tool bar and terminating at a forward end, a vertical bar structure pivotally attached at its upper end to the forward end of said upper arm structure for pivotal movement about a third axis parallel to said first axis, said vertical arm structure being pivotally attached at a location below the upper end thereof to the forward end of said lower arm structure for pivotal movement about a fourth axis below and parallel to said third axis, said vertical bar structure maintaining said upper and lower arm structures parallel to each other during any pivotal movement thereof, said vertical bar structure having a downward projecting extension terminating in a lower end, an implement arm located below said lower arm structure, said implement arm extending downward and rearward from an upper end thereof located below and adjacent said fourth axis to a lower end upon which said soil engaging tool is mounted, connecting link means pivotally connected at one end thereof to the upper end of said implement arm for pivotal movement about a fifth axis parallel to and below said fourth axis, said connecting link means being pivotally connected at an end opposite from said one end thereof to said lower arm structure at a location rearward of the forward end thereof for pivotal movement about a sixth axis parallel to and rearward of said fourth axis, the lower end of said extension being pivotally connected to said implement arm between the

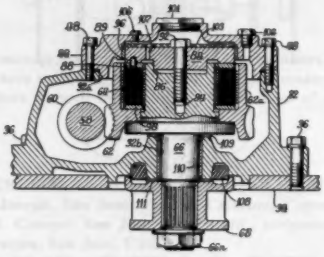
ends thereof for pivotal movement about a seventh axis parallel to and rearward of said fifth axis whereby the lower end of said implement arm moves in a substantially vertical direction.

4,004,641

MOTOR GRADER DRAWBAR ASSEMBLY WITH SAFETY CLUTCH MECHANISM

Vergil P. Hendrickson, Morton, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 24, 1975, Ser. No. 551,931
Int. Cl.² E02F 3/76; A01B 61/04
U.S. Cl. 172—781 **10 Claims**



8. In a drawbar assembly for use on a motor grader or the like including: a drawbar frame; a ring gear rotatably mounted on the frame; a blade; and means interconnecting the blade and the ring gear so that the blade revolves as the ring gear rotates; characterized by:

a rotatable shaft;

a pinion gear engaged with the ring gear and mounted on the shaft for rotation therewith;

drive means for selectively rotating the shaft and hence rotating the ring gear;

a slip clutch mounted on the shaft and interposed between the drive means and the shaft to allow relative movement between the shaft and drive means when a preselected torque is exceeded, and thereby permitting the blade to revolve about an upright axis;

a plate at one end of the shaft and operatively engaged with the slip clutch for applying a compressive force thereon; and

a part operatively connected to the plate and adjustably engaged with the shaft for adjustably changing the compressive force and hence adjusting the preselected torque to change the force on the blade required to cause the relative movement.

4,004,642

TROUND TERRA-DRILL PROCESSES AND APPARATUS

David Dardick, 500 Via Del Monte, Palos Verdes Estates, Calif. 90274

Filed Dec. 8, 1975, Ser. No. 638,310
Int. Cl.² E21B 7/00
U.S. Cl. 175—4.5 **15 Claims**

1. A terradynamic apparatus for drilling through soil and rock and capable of penetration of hard rock to great depths comprising:

an open chamber salvo gun for firing salvos of small calibre projectiles,

a self-contained feed system for successively feeding tiangular rounds of ammunition of open chamber salvo ammunition to said gun,

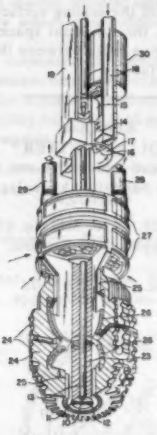
mechanical pulverizing means disposed in proximity to said gun for pulverizing the fractured rock,

rock removal means disposed in proximity to said gun for removal of pulverized rock from the areas about said gun,

self-contained powering means for operating said gun, said feed system, said pulverizing means, and said removal means,

a self-contained pod and support means for all of said gun, ammunition, feed system pulverizing means, and removal means,

said terradynamic apparatus being operated independently of the surface of the earth for repetitively firing salvos to fracture the rock, pulverize the fractured rock, and displace the pulverized rock.



12. A terrodynamic process for drilling rock by the use of a self-contained drilling unit that is lowered into the ground and automatically fires projectiles into the rock at a velocity sufficient to fracture the rock and wherein the self-contained drilling unit contains a sufficient number of projectiles to drill to great distances, the improvement in said process wherein the projectiles being fired of small calibre and a salvo of such projectiles are fired employing triangular rounds of ammunition and an open chamber gun.

4,004,643

MECHANICAL DRILLING JAR

James L. Newman, 970 Starewood Drive, Beaumont, Tex. 77706

Filed Mar. 3, 1976, Ser. No. 663,438
Int. Cl.² E21B 1/10
U.S. Cl. 175—321 **5 Claims**

1. In a device for connection in a drill string, the combination of:

a housing assembly having an interior cylindrical sealing surface, and

a movable assembly within the housing assembly, slideably and sealingly engaged with said surface,

the housing assembly having an interior surface above the sealing surface, surrounding the movable assembly and separated therefrom to define a lubricant space opening to the sealing surface, and

the housing assembly further having an annular trap space open to the lubricant space and concentric with the sealing surface near its tip, with an inner diameter greater than the diameter of the sealing surface,

whereby debris from the lubricant space can settle in the trap space rather than enter between the movable assembly and sealing surface.

4,004,644

ROLLER CUTTER

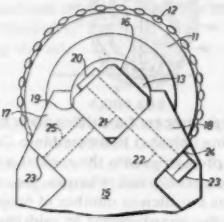
Bernt Soren Liljekvist, and Anders Persson, both of Sandviken, Sweden, assignors to Sandvik Aktiebolag, Sandviken, Sweden

Filed Jan. 27, 1976, Ser. No. 652,864

Claims priority, application Sweden, Jan. 27, 1975, 7500816

Int. Cl.² E21B 9/08

U.S. Cl. 175—364 **5 Claims**



1. A drill bit cutter assembly including:

a cutting unit rotatably mounted on a bearing shaft;

two opposed saddle structures each said saddle structure having two spaced-apart legs providing therebetween a recess for receiving an end of said shaft;

said recess and said shaft end being of complemental polygonal shape, said shaft end being s cured to its recess by a bolt that extends through a transverse bore of the shaft and a saddle bore aligned therewith,

the improved construction according to which both legs of said saddle are provided with bores each of which extends entirely through one leg, said bores being angled relative to one another, and said shaft-receiving recess between said legs being of a polygonal shape complemental to that of the shaft end such that said shaft is adjustable in two positions having its transverse bore aligned with said bores of said legs of the saddle in both said positions.

4,004,645

DISC CUTTING UNITS FOR USE ON ROCK BORING MACHINES

Gwilym James Rees, 11 Granada Road, and Henry Bingham, 26 Coaton Ave., both of Selcourt, Springs, Transvaal, South Africa

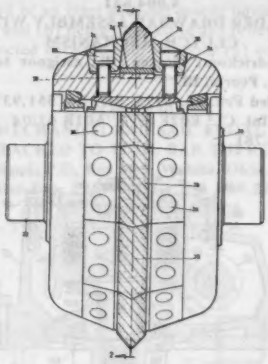
Filed July 22, 1975, Ser. No. 598,167

Claims priority, application South Africa, July 31, 1974, 74/4897

Int. Cl.² E21B 9/08

U.S. Cl. 175—373 **4 Claims**

2. A rock boring machine of the kind including a rotatable head plate, a plurality of rotatable disc cutters mounted on the front base of said rotatable head plate, each disc cutter comprising an annular body, a plurality of cutting segments located on and substantially encircling the annular body around the periphery thereof, a plurality of separate formations spaced about the periphery of the annular body, each cutting segment being provided with a complementary formation



adapted to lockingly engage one of the formations on the body to prevent peripheral movement of the cutting segments around the body, and removable clamping means for securing the cutting segments to the annular body.

4,004,646

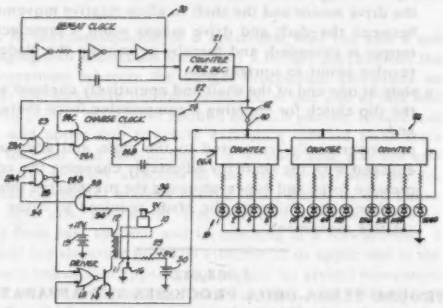
WEIGHING SYSTEM

Albert E. Busch, 2400 Barbara St., Bloomington, Ind. 47401

Filed Nov. 20, 1975, Ser. No. 633,634

Int. Cl.² G01G 7/02, 23/37

U.S. Cl. 177—1 **7 Claims**



1. A method of weighing in which a weighing platform is connected to a relatively movable element of electromagnet means, the steps including, initiating a current flow through said electromagnetic means, and measuring the time required for the current to build up to a sufficiently high value to produce movement of said platform.

4,004,647

LOAD CELL ARRANGEMENT

Donald Laverne Forst, Norton, and Edwin Benedict Schrengauer, Wadsworth, both of Ohio, assignors to The Babcock & Wilcox Company, New York, N.Y.

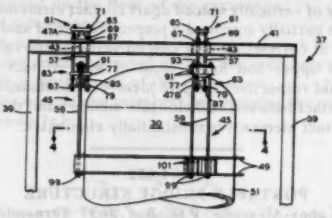
Filed Jan. 30, 1976, Ser. No. 654,144

Int. Cl.² G01G 21/00

U.S. Cl. 177—128 **15 Claims**

1. In combination with a material transport system including at least one reservoir for accumulating a predetermined quan-

tity of material, at least one pair of load monitors capable of continuously determining the quantity of material contained within said reservoir, and support structure normally convey-



ing the reservoir load through both of the monitors, said support structure including means allowing replacement of one of the monitors without interruption of operation of said other monitor.

4,004,648

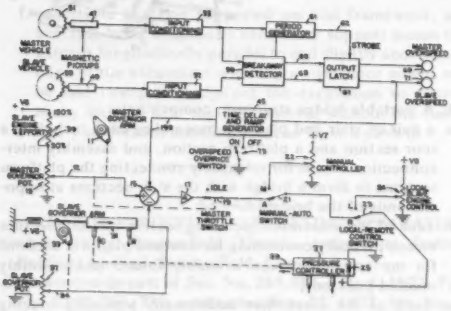
MULTI-ENGINE, ARTICULATED VEHICLE APPARATUS

Craig L. Joseph, San Jose; Fred J. Caterina, Cupertino, and Hans H. Cremer, San Jose, all of Calif., assignors to FMC Corporation, San Jose, Calif.

Filed Mar. 27, 1975, Ser. No. 562,538

Int. Cl.² B60K 5/08

U.S. Cl. 180—14 R **9 Claims**



1. In an articulated vehicular apparatus including a master vehicle, said master vehicle having an engine and associated throttle and drive shaft for drive shaft for driving a ground engaging wheel of the master vehicle, and a slave vehicle, said slave vehicle having an engine and associated throttle and drive shaft for driving a ground engaging wheel of the slave vehicle, an electronic governor controlling the entine of the slave vehicle comprising:

first signal generating means operatively associated with the ground engaging wheel of said master vehicle for producing a first signal indicative of the angular velocity of said wheel;

second signal generating means operatively associated with the ground engaging wheel of the slave vehicle for producing a second signal indicative of the angular velocity of said wheel;

wheel speed signal comparison means connected to said first and second signal generating means for producing a signed wheel speed difference of said second and said first signals;

master throttle signal generating means connected to the throttle of the master vehicle for producing a master throttle signal indicative of the throttle setting of the master vehicle;

slave throttle signal generating means connected to the throttle of the slave vehicle for producing a slave throttle signal indicative of the throttle setting of the slave vehicle;

control signal comparison means connected to said master throttle signal generating means and to said slave throttle signal generating means

means for selectively coupling said wheel speed difference signal to said control signal comparison means when the value of said second signal exceeds the value of said first signal, said signal comparison means producing a signed throttle control signal having a value determined by the values of said master throttle signal, said slave throttle signal and any wheel speed difference signal received; and

actuator means responsive to said throttle control signal, said actuator means being connected to the throttle of the slave vehicle for adjusting the throttle of the slave vehicle to restore equality between said master throttle and said slave throttle signals.

4,004,649

MUFFLER

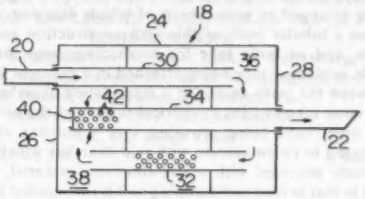
Yukio Shimada, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Japan

Filed Mar. 17, 1975, Ser. No. 559,234

Claims priority, application Japan, May 23, 1974, 49-59417[U]

Int. Cl.² F01N 3/06

U.S. Cl. 181—36 C **7 Claims**



1. In an exhaust system for an internal combustion engine, a catalytic converter having an inlet connected in operation with an exhaust pipe of an internal combustion engine and an outlet; and

a muffler comprising a tubular body having a bore and a first and second end closures on both ends, respectively, to close the bore; means dividing the bore of said tubular body into a first expansion chamber in the proximity of the first and closure, means dividing said bore into a second expansion chamber in the proximity of the second end closure and into a third expansion chamber between the first and second expansion chambers; a first exhaust gas conduit having an exhaust gas inlet end connected with the outlet of said catalytic converter, the first exhasut gas conduit extending through the first end closure, the first expansion chamber and the third expansion chamber and having an exhaust gas outlet end projecting into the second expansion chamber; a second exhaust gas conduit having an exhaust gas inlet end opening to the second expansion chamber, the second exhaust gas conduit extending through the third expansion chamber and having an exhaust gas outlet end projecting into the first chamber; and a third exhaust gas conduit having an inlet end projecting into the first expansion chamber, the third exhaust gas conduit extending through the third expansion chamber, the second expansion chamber and the second end closure and having an exhaust gas outlet end opening to the ambient atmosphere, closing means closing the inlet end of the third conduit, the third exhaust gas conduit having a group of apertures in that portion of the third exhaust gas conduit which projects into the first expansion chamber and which is exposed to the third expansion chamber, and the group of apertures being so shaped and arranged such that broken peices issued from

said catalytic converter and contained in the exhaust gases within the third expansion chamber are prevented from entering the third exhaust gas conduit.

4,004,650

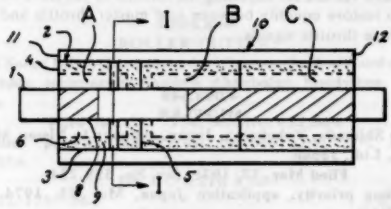
SILENCERS

Lars Johan Gardell, Enhorna, and Bertil Lennart Wilhelmsson, Alvsjo, both of Sweden, assignors to Saab-Scania Aktiebolag, Sodertalje, Sweden

Filed Dec. 29, 1975, Ser. No. 644,548

Int. Cl.² F01N *1/04*

U.S. Cl. 181—42 **6 Claims**



1. A silencer for damping sound waves created in gases, said silencer comprising a group of at least two straight damping units arranged in series, each of which damping units comprises a tubular body of thin-wall construction and two end walls, and an inner tube for conducting gases through said walls, said inner tube being attached in a gas-tight fashion and between the walls enclosing a ring-shaped chamber between the inner tube and the cylindrical surface of the tubular body, the inner tube being provided with a number of openings arranged to communicate with said chamber which is at least partially provided with sound-absorbing material, characterised in that at least one damping unit is surrounded by an outer tube which is connected in a gas-tight fashion through two end walls with the cylindrical surface of the damping unit, and in that the space between the cylindrical surface and the outer tube is divided into at least two chambers each of which is arranged to communicate with the inner tube through at least one transversely-extending branch pipe.

4,004,651

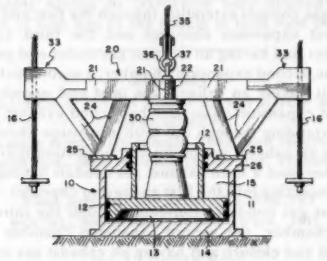
MEANS FOR FLEXIBLY GUIDING THE TRAVEL OF AN UPWARDLY PROPELLED WEIGHT

Clifford D. Dransfield, Dallas, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Sept. 8, 1975, Ser. No. 611,351

Int. Cl.² G01V *1/04*

U.S. Cl. 181—117 **16 Claims**



1. In an apparatus for flexibly guiding the path of a moving weight above the earth including an upstanding frame within which the weight is upwardly propelled, a plurality of parallel elongate members connected between the top and the bottom of the frame and spaced laterally adjacent the weight, and a like plurality of means rigidly interconnected with the weight for guiding the weight along the respective elongate members, the improvement wherein each of said guide means comprises a plurality of vertically spaced apart contact elements adapted to at least partially surround a respective one of said elongate members at correspondingly spaced vertical intervals, so that when the upper and lower most of said contact elements engage said respective elongate member simultaneously, frictional contact between said elongate member and the intermediate contact elements is substantially eliminated.

4,004,652

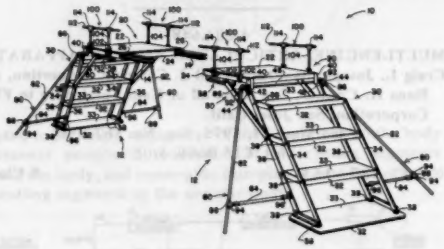
PORTABLE BRIDGE STRUCTURE

Samuel Laboy-Alvarado, P.O. Box 8637 Fernandez Juncos Sta., Santurce, P.R. 00910

Filed Apr. 12, 1976, Ser. No. 675,746

Int. Cl.² E04G *1/30*

U.S. Cl. 182—118 **10 Claims**



1. A portable bridge structure, comprising:

a. a pair of stair and platform assemblies each including a stair section and a platform section, and assembly interconnection means for releasably connecting the platform sections to form a bridge with the stair sections at opposite ends of the bridge;

b. each of the assemblies including section interconnection means pivotally connecting its stair and platform sections for movement between assembly folded and assembly erected positions;

c. each of the assemblies additionally including bracing means for releasably maintaining its stair and platform sections in one of a plurality of predetermined assembly erected positions, the bracing means being pivotally connected to one of the sections for movement between brace folded and brace erected positions and being selectively connectable when in brace erected positions with one of a plurality of formations carried on the other sections;

d. each of the stair sections including a plurality of tread members and support means pivotally connected to the tread members for maintaining load support surfaces defined on the tread members in substantially parallel relationship as the tread members pivot relative to the support means between stair folded and stair erected positions;

e. the sections, bracing means, tread members and support means of each assembly being operative when in the assembly folded, brace folded and stair folded positions, respectively, to lie closely alongside each other to form a compact, substantially flat bundle.

4,004,653

GRAVE FRAME

Ray C. Hass, Niles Road, St. Joseph, Mich. 49085

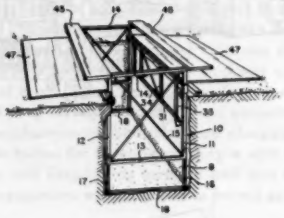
Filed July 14, 1975, Ser. No. 595,350

Int. Cl.² E04G *25/00*

U.S. Cl. 182—128 **4 Claims**

1. A rectangular framework for excavations such as graves and the like comprising

a. rigid end members extending from the top to the bottom of the excavation, said end members being adapted to engage the opposite ends of the excavation and to be supported on the floor of the excavation;
b. rigid side means;
c. elements included in said side means, each having ends adapted to be supported on said end members positioned at the opposite ends of the excavation;
d. means on said end members for engaging the ends of said elements (c);



e. means to elongate said elements (c) against said means (d) whereby to press said end members against the opposite ends of said excavation and hold said side means tightly between said means (d) thus providing a rigid framework;
f. adjustable brackets supported on said framework, said brackets being adapted to carry floor support means that extends longitudinally parallel to and slightly above a side edge of the excavation whereby a rigid floor means may be laid nearly flat adjacent the excavation to support heavy weights near the edge thereof without the risk of injury to persons standing thereon from a cave-in.

4,004,654

ELEVATOR STRUCTURE SUPPORTING APPARATUS

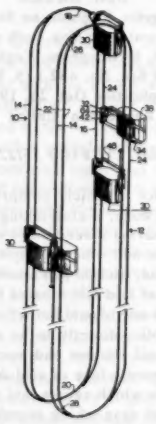
Norbert Hamy, Beaconsfield, Canada, assignor to Trebron Holdings Limited, Beaconsfield, Canada

Continuation-in-part of Ser. No. 269,453, July 6, 1972, Pat. No. 3,896,736. This application Feb. 25, 1975, Ser. No. 552,807

Claims priority, application United Kingdom, July 7, 1971, 31821/71

Int. Cl.² B66B 9/16

U.S. Cl. 187—16 **11 Claims**



1. A supporting apparatus for supporting a container member for movement on a pair of vertical rails and for permitting relative shifting movement therealong and rotational movement with respect thereto, said apparatus comprising a pair of first frame means, wheel means carried by each of said first frame means and rotatably disposed on said rails permitting movement of each of said first frame means therealong, a pair of second frame means pivotally mounted on said pair of first frame means and being movable therewith, link means extending between and pivotally connected to said container member and said second frame means permitting movement of said container with said first frame means and swingable movement with respect thereto, a fluid actuable means for actuating said link means to shift said container member relative to said first frame means and second frame means, and clutch means operatively associated with second frame means and mounted thereon, said clutch means permitting said container to maintain a constant angular relationship with respect to the vertical rails.

4,004,655

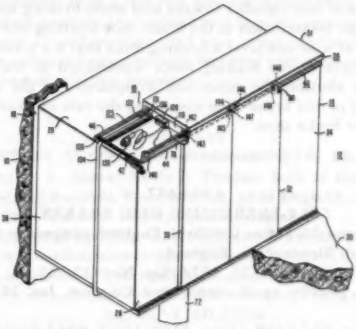
ELEVATOR SYSTEM INCLUDING DOOR OPERATOR HAVING AN ENCLOSURE WHICH FORMS TRACK FOR DOOR ROLLERS

Joseph K. Kraft; Robert A. Sette, both of Gettysburg, and Leigh F. Jackson, Fayetteville, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 28, 1975, Ser. No. 608,481

Int. Cl.² B66B 13/08

U.S. Cl. 187—52 R **6 Claims**



1. An elevator system, comprising:
an elevator car having side, bottom and top portions with a passenger opening in a side portion thereof,
a door operator including a drive motor, door position switches, and associated electrical control all mounted within a common enclosure permitting open wiring therebetween,
said common enclosure including a channel shaped base member having a bight and first and second leg portions, said base member being mounted on the top portion of said elevator car with the first leg portion forming an upstanding track adjacent to the side portion which includes the passenger openings,
a door including a hanger having rollers mounted thereon, said door and hanger being mounted for movement to open and close the opening in said elevator car, with the rollers of the hanger engaging said upstanding track,
and means coupling the door operator with the hanger of said door to impart linear motion thereto.

4,004,656

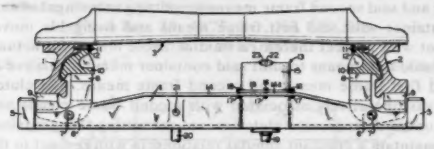
MULTI-BRAKE SHOE MEANS FOR A MULTI-BRAKING SURFACE BRAKED ASSEMBLY

Robert B. Morris, North Huntingdon, Pa., assignor to Westinghouse Air Brake Company, Wilmerding, Pa.

Filed June 17, 1975, Ser. No. 587,600

Int. Cl.² B61H *13/00*

U.S. Cl. 188—52 14 Claims



13. Multi-brake shoe means for transmitting braking force to braking surfaces formed respectively on a pair of wheels mounted in spaced-apart relation on a common axle and on a pair of brake drums mounted respectively on said pair of wheels, said multi-brake shoe means comprising:

a. a member movable toward and away from said braking surfaces on said wheels and drums,

b. a plurality of brake shoes for transmitting braking force to said braking surfaces, and, wherein the improvement comprises:

c. at least one means mounted intermediate its ends on said movable member, each end of said at least one means being effective to move at least one of said brake shoes therewith upon movement of said member toward said multi-braking surfaces, further characterized in that said at least one means comprises at least one lever that at each of its respective opposite ends abuts at least one of said plurality of brake shoes, said at least one lever being so pivotally mounted intermediate its ends on a fulcrum fixed to said movable member as to provide, upon movement of said member toward said multi-braking surfaces, for the transmission to the brake shoe abutting one end of said at least one lever a braking force that is a preselected multiple of the braking force transmitted to the brake shoe abutting the other end irrespective of the rate of wear of one brake shoe exceeding the rate of wear of the other brake shoe.

4,004,657

SELF-ENERGIZING DISC BRAKES

Piotr Ostrowski, Sutton Coldfield, England, assignor to Girling Limited, Birmingham, England

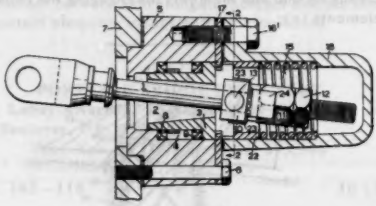
Filed Jan. 21, 1974, Ser. No. 435,311

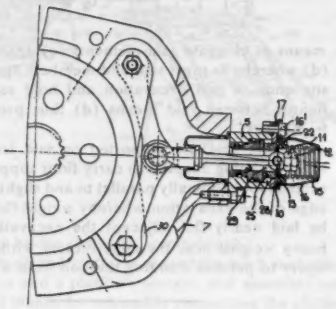
Claims priority, application United Kingdom, Jan. 20, 1973, 3075/73

Int. Cl.² F16D *55/04*; S16D *55/18*; F16J *1/10*

U.S. Cl. 188—71.3 1 Claim

1. In a spreading disc brake of the type having pressure plates which are angularly movable within a brake housing to initiate application of the brakes and wherein the angular movement of the plates is effected by an annular fluid pressure actuator which acts on an abutment carried by a pull-rod passing through the actuator with substantial clearance to operate in tension on toggle links connected to said pressure plates; said actuator being a cylinder housing rigidly fixed to the brake housing with the cylinder axis substantially at right angles to the axis of the plates and a piston operating in said cylinder: the invention comprising improved means for transmitting the thrust of said piston to the abutment carried by the pull-rod comprising a thrust member co-axially aligned with the piston and slidable therewith in said cylinder housing to transmit the force exerted by the piston, spring means urging said thrust member against said piston and urging said piston into the retracted position, a trunnion member forming part of said thrust member, part cylindrical bearings in said thrust member for rockably receiving said trunnion member, a substantially annular member slidably received in said cylinder housing between said thrust member and said spring means, said annular member having part cylindrical bearings complementary to the bearings in said thrust member and also rockingly receiving said trunnion member, and key means cooperating with said cylinder housing and said thrust member for





maintaining the pivotal axis of the coupling parallel to the axis of the brake while confining angular movement of said pull-rod to a plane normal to the axis of the brake, said key means comprising an apertured plate fixed to said cylinder housing and extending across the outer end of the cylinder, an axially extending slot in said thrust member, and a projection on said apertured plate extending into said slot.

4,004,658

SLIDING CALIPER RETAINING MECHANISM FOR A DISC BRAKE

Hugh Genville Margetts, Shipston on Stour, and Gordon Alfred Habgood, Leamington Spa, both of England, assignors to Girling Limited, Birmingham, England

Continuation of Ser. No. 452,133, March 18, 1974, abandoned. This application Oct. 21, 1975, Ser. No. 624,472

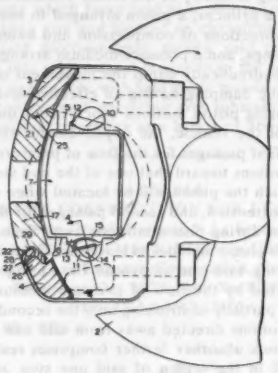
Claims priority, application United Kingdom, Mar. 17, 1973, 12969/73

Int. Cl.² F16D *55/224*

U.S. Cl. 188—73.5 12 Claims

1. A disc brake for a vehicle comprising a rotatable disc having a peripheral edge, a drag-taking member adjacent to said disc, a caliper having spaced limbs straddling said peripheral edge of said disc and which are symmetrical with respect to a radius of said disc, friction pad assemblies for engagement with opposite faces of said disc located in said caliper, actuating means housed in one of said limbs for applying one of said friction pad assemblies directly to an adjacent face of said disc, the other of said friction pad assemblies being applied indirectly to the opposite face of said disc by the reaction of said actuating means which causes said caliper to slide axially with respect to said drag-taking member, circumferentially spaced arms in said drag-taking member having axially spaced opposite ends, inner faces of said arms defining therebetween

a gap in which said caliper is located, said caliper having circumferentially spaced opposite end faces adjacent said inner faces of said arms, a key of a length substantially equal to that of said arms interposed between one of said opposite end faces and said inner face of one of said arms, and an elongate resilient member interposed between the said one end face and said key over the total length thereof to urge the other of said opposite end faces into direct sliding engagement with the other of said inner faces, said elongate resilient member being substantially flat at least in a transverse direction and being provided at opposite ends with spaced tags which straddle opposite ends of said key and project in a direction away from said caliper by a distance greater than the distance between said resilient member and the said one of the said arms to engage with said axially spaced opposite ends of the said one of said arms to prevent said key from moving with respect to said drag-taking member as said caliper is moved axially in the application of the brake, said elongate member comprising sole means for locating said key in said brake and with respect to said drag-taking member and said tags being urged out of engagement with said arm to permit said key and



said resilient member to be withdrawn from said brake in an axial direction, wherein said one of said opposite end faces of said caliper is formed with an axially extending outwardly directed groove of generally V outline comprising inner and outer relatively inclined surfaces, said inner face of said one at said arms is formed with a complementary projection of generally V outline comprising inner and outer relatively inclined surfaces spaced respectively from said inner and outer surfaces of said groove, said key has on one side first and second relatively inclined abutment surfaces which engage slidably with said inner and outer surfaces of said projection and on an opposite side a third abutment surface spaced from and parallel with said outer surface of said groove, and said resilient member acts between said third abutment surface and said outer surface of said groove, and wherein said key includes a projection equal in length to that of said key, said key projection extending from the said opposite side of said key towards the said outer surface of said groove and having an inner edge between which and said inner surface of said groove is defined a clearance gap in which said resilient member is located.

4,004,659

CLOSURE FOR BRAKE JAW HOLDER FOR DISC BRAKES

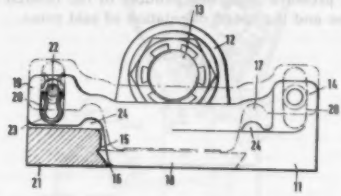
Hans Rocholl, and Willi Klein, both of Remscheid, Germany, assignors to Bergische Stahl-Industrie, Remscheid, Germany

Filed July 10, 1975, Ser. No. 594,709

Claims priority, application Germany, July 15, 1974, 2434004

Int. Cl.² F16D 65/04

U.S. Cl. 188—244 **7 Claims**



1. A closure for a brake jaw holder for disc brakes, which includes in combination: a first member forming a brake lining carrier having a rear side and provided with a lining carrying surface and having an opening, guiding means associated with said carrier for guiding a brake lining, a second member forming a closure latch movable from the rear side of said brake lining carrier into said opening for closing the same, said closure latch extending in a direction transverse to the direction of said guiding means, said second member at both sides of said opening being provided with oblong opening means having the longitudinal axis thereof extending substantially perpendicularly with regard to said lining carrying surface, elastic arresting means arranged in said second member, pin means fixedly arranged in said first member, said closure latch being movable from a first end position representing its maximum open position to a second end position representing its maximum closed position and vice versa, and said elastic arresting means being operable to arrest said closure latch in either one of said end positions.

4,004,660

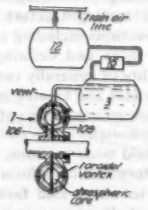
CONTROL SYSTEM FOR HYDROKINETIC BRAKES

Anthony G. L. Shore; Kevin S. Preston, both of Derby, and David A. Churchill, Warwickshire, all of England, assignors to British Railways Board, London, England

Continuation of Ser. No. 425,761, Dec. 18, 1973, abandoned, which is a continuation-in-part of Ser. No. 106,163, Jan. 13, 1971, abandoned. This application June 27, 1975, Ser. No. 590,909

Int. Cl.² F16D 63/00

U.S. Cl. 188—271 **10 Claims**



1. A method for controlling a brake system embodying a hydrokinetic brake of the type having a rotor and a stator together defining a toroid and also having inlet and outlet ports for liquid flowing continually through the brake during brake application from said inlet port to said outlet port, comprising the steps of:

maintaining for each desired braking torque an essentially

constant flow of said liquid into said inlet port from a liquid reservoir, said essentially constant flow being independent of the speed of rotation of said rotor;

conveying said liquid from said outlet port to said liquid reservoir;

controlling the braking torque of said brake essentially independently of the speed of rotation of said rotor by setting the pressure acting on said liquid reservoir in accordance with the desired braking torque;

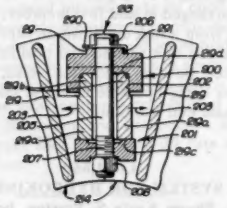
maintaining the pressure at said inlet port at a fixed pressure which is lower than the pressure in said reservoir, said fixed pressure being independent of the desired braking torque and the speed of rotation of said rotor.

4,004,661

SPLIT BRAKE DISC

Franklin B. Airheart, Sylmar, and Samuel J. Martins, Reseda, both of Calif., assignors to Airheart Products, Inc., Chatsworth, Calif.

Filed May 12, 1975, Ser. No. 576,616
Int. Cl.² F16D *65/12*
U.S. Cl. 188—218 XL **5 Claims**



1. A braking disc assembly connectible to rotating structure, comprising

a. multiple arc shaped disc body sections having opposite faces for engagement with brake pads,

b. and retention means between said opposite faces for releasably retaining said sections in assembled relation to form an integrated disc with said faces maintained in two parallel planes,

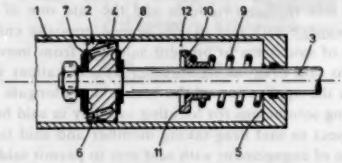
c. said sections including connecting means for attaching the sections to said rotating structure, said sections being semi-circular, the sections including parallel plates defining said opposite faces and defining a space therebetween, and a plurality of generally radially extending ribs integral with said plates and located in the space therebetween, said retention means being entirely located in said space and between radially inner and outer limits of said opposite faces of said body sections, the sections having adjacent abutting terminal ends forming a joint between said sections and to which said faces extend, and said retention means including separate radially spaced inner and outer retainers each bridging said joint and being releasably connected to one of said ribs on each side of said joint, the retention means further including a threaded fastener shaft extending between said connected ribs to hold said retainers in position, and at least one of the retainers telescopically interfitting portions of said connected ribs.

4,004,662

SHOCK ABSORBER WITH DIFFERENT DAMPING EFFECTS AT DIFFERENT PARTS OF STROKE

Ulrich Sorgatz, and Fritz Ammesdorfer, both of Wolfsburg, Germany, assignors to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Continuation of Ser. No. 510,885, Oct. 1, 1974, abandoned. This application Sept. 17, 1975, Ser. No. 614,147
Claims priority, application Germany, Oct. 16, 1973, 2351813
Int. Cl.² F16F *9/49*
U.S. Cl. 188—284 **2 Claims**



1. In a hydraulic shock absorber for use in the suspension system associated with a motor vehicle wheel so as to reduce the dynamic tilting tendency of the motor vehicle, said shock absorber having a cylinder, a piston arranged to move within the cylinder in directions of compression and extension between two end stops, and a pressure medium arranged within the cylinder to hydraulically damp the movement of the piston, said hydraulic damping having an effective level of normal damping during piston motions which occur during normal operation of the vehicle, the improvement wherein the piston includes first passages for the flow of pressure medium during piston motions toward that one of the end stops in the proximity of which the piston will be located when moved in the direction of extension, and second passages for the flow of pressure medium during piston motions away from said one stop; wherein the piston includes at least one flat spring on the side thereof facing said one stop, said flat spring being arranged to be lifted by the flow of pressure medium from a position at least partially obstructing only the second passages during piston motions directed away from said one stop; and wherein said shock absorber further comprises rest element means, disposed in the region of said one stop and spring supported in the direction towards said one stop so as to rest against said flat spring only when the piston is in said region, for providing at least a partial obstruction of said second passages and thus abruptly increasing the hydraulic damping, to a level substantially above said normal damping, of only the piston motion directed away from said one stop only after the piston has approached closer to said one stop than is usual during normal operation of the vehicle.

4,004,663

ELECTRICALLY CONTROLLED BRAKE ASSEMBLY WITH NON-COCKING OPERATING ARM

Robert L. Stibbe, Janesville, Wis., assignor to Warner Electric Brake & Clutch Company, South Beloit, Ill.

Filed Feb. 17, 1976, Ser. No. 658,371
Int. Cl.² B60T *7/12*; **F16D** *51/48*
U.S. Cl. 188—332 **4 Claims**

1. An electrically controlled brake assembly for use with a rotatable drum, said brake assembly comprising a stationary backing plate, a pair of brake shoes pivotally mounted on said backing plate and having ends disposed adjacent one another, an operating arm pivoted intermediate its ends on said backing plate to turn about an axis extending substantially perpendicular to said plate and in a plane extending substantially parallel to said plate, means carried on said operating arm on one side of said axis and located between the adjacent ends of said shoes to bear against one of said shoes when said arm is

turned in one direction about said axis and to bear against the other of said shoes when said arm is turned in the opposite direction about said axis, and electromagnet means carried on said operating arm on the opposite side of said axis and operable when energized to engage said drum and cause said operating arm to turn about said axis in one direction or the other depending upon the direction of rotation of said drum, the improvement in said brake assembly comprising, guide means fixed on said backing plate and located between said backing

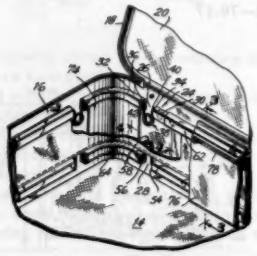
plate and said electromagnet means, said guide means and said backing plate coacting to define a channel means having an open side which faces said axis, and projecting means on said operating arm and located on circumferentially opposite sides of said electromagnet means, said projecting means extending into said channel means from the open side thereof and being engageable with said guide means and said backing plate to confine said operating arm substantially within said plane when said operating arm is turned about said axis.

4,004,664

FRAME CONSTRUCTION FOR LUGGAGE

Joseph Y. Pelavin, North Bergen, N.J.; Seymour Spiegelman, Whitestone, N.Y., and John S. Rastocny, Cliffside Park, N.J., assignors to Lark Luggage Corporation, New York, N.Y.

Filed Apr. 21, 1976, Ser. No. 679,123
Int. Cl.² A45C *13/36*
U.S. Cl. 190—49 **12 Claims**



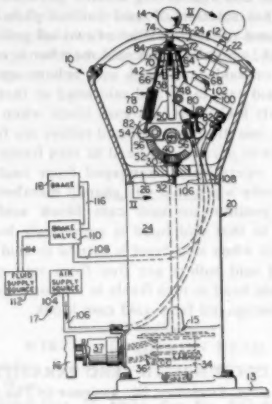
1. In an article of luggage, a luggage case having a peripheral side wall made of a flexible sheet material and having an inner surface directed toward the interior of the luggage case, and frame means engaging said side wall at said inner surface thereof and extending along said side wall for imparting a degree of rigidity thereto, said frame means including at each of a plurality of regions thereof a pair of substantially rigid frame portions respectively terminating in free ends which are spaced from and directed toward each other, and spring means operatively connected with said frame portions for urging them apart from each other to tend to increase the distance between said free ends thereof so that the article of luggage is capable of resiliently yielding at said side wall thereof in response to impacts, crushing forces, and the like.

4,004,665

TRANSMISSION AND PARKING BRAKE CONTROL SYSTEM

Richard E. Guhl, and Charles W. Oswald, both of Decatur, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 4, 1975, Ser. No. 637,607
Int. Cl.² B60K *29/02*; **F16H** *57/10*
U.S. Cl. 192—4 A **2 Claims**



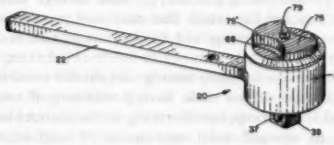
1. A transmission and brake control system comprising;
a rotary drive train including a transmission shiftable between neutral and a plurality of drive conditions for operation of said drive train;
a brake for inhibiting movement of said drive train;
a transmission control arrangement operatively connected to said transmission for selectively establishing said neutral and said drive conditions including a single control lever assembly shiftable in a plane for selecting said drive conditions and shiftable normal to said plane at said neutral condition into a braking condition;
a brake control arrangement including means for communicating a source of pressure with said brake for disengagement thereof and an actuator valve communicating with said means for relieving fluid pressure to said brake and allowing engagement of said brake solely when said control lever assembly is positioned in said braking condition; and
an overcenter spring mechanism for biasably holding said control lever assembly normal to said plane in either said braking condition or said drive conditions.

4,004,666

REVERSIBLE SOCKET WRENCH

Carlos R. Hinojosa, Camuy, P.R., assignor to Besenbruch-Hofmann, Inc., Lindenhurst, N.Y.

Filed Oct. 23, 1975, Ser. No. 624,787
Int. Cl.² F16D *41/08*
U.S. Cl. 192—44 **10 Claims**



1. A reversible wrench, comprising:
a ring shaped head;
a cup shaped member having a cylindrical wall rotatable axially in said head, said wall having a plurality of spaced slots therein;

a cam block rotatably disposed inside said cup shaped member, said block having a plurality of circumferentially spaced cam faces adjacent to said slots;

a plurality of cam wedge rollers rotatably engaged in said slots between said cam faces respectively and said head;

a reverse control plate rotatably mounted at one axial end of said head, said plate having a depending pin, said cup shaped member having an end wall overlaying said cam block, said end wall having another slot for receiving said pin, so that rotation of said control plate rotates said member and rollers to either of two set positions on said cam block, whereby when said member is turned to one position on said cam block said rollers are cammed to engage said cam faces and said head so that said head is operatively locked to said cam block when said head is turned in one directon, and said rollers are free from said cam faces to permit said head to turn freely in the other direction operatively disengaged from said cam block, and whereby when said cup shaped member is turned to another position on said cam block said rollers are cammed to that said head is operatively locked to said cam block when said head is turned in said other direction, and said rollers are free from said cam faces to permit said head to turn freely in said one direction operatively disengaged from said cam block.

4,004,667

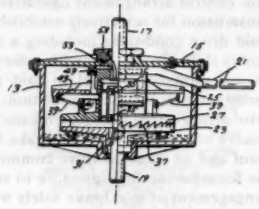
OVERLOAD CLUTCH WITH ZERO PARASITIC TORQUE

Ramojus P. Vaitys, Evanston, Ill., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Continuation-in-part of Ser. No. 314,623, Dec. 13, 1972, abandoned. This application Sept. 24, 1974, Ser. No. 508,946

Int. Cl.² F16D *7/02*

U.S. Cl. 192—56 R **3 Claims**



1. An overload clutch for use in an aircraft arrêstment system, said clutch comprising a cylindrical housing having a cover, an input shaft axially disposed within said housing and extending upwardly through the cover thereof, a driving rotor mounted in said housing on said input shaft, a splined hub integral with said driving rotor and extending downwardly therefrom, a shuttle rotor slidably mounted on said splined hub for axial movement thereon, an output shaft axially disposed within said housing and extending downwardly through the bottom thereof, a driven disk mounted on said output shaft, a plurality of shelves on the inner wall of said driving rotor, a corresponding plurality of shelves on the outer wall of said shuttle rotor, a rocker bar positioned on each of said plurality of shelves, a plurality of leaf springs disposed between said rocker bars such that each end portion of each of said leaf springs is juxtaposed against one of said rocker bars, said leaf springs being normally in the buckled state to exert a compressive force for maintaining said shuttle rotor in engagement with said driven disk during rotation of said driving rotor, said leaf springs transforming to the unbuckled state in response to upward axial movement of said shuttle rotor caused by a sudden application of torque above a predetermined level to said output shaft, said shuttle rotor being held in disengagement from said driven shaft by said unbuckled leaf springs, and means for resetting said shuttle rotor into operative engagement with said driven disk for rotation by said driving rotor.

4,004,668

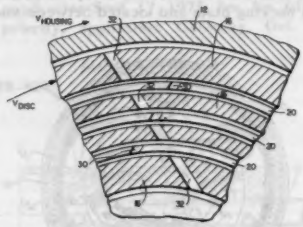
FAN DRIVE SECANT PUMPING GROOVES

Everett George Blair, Plainfield, Ind., assignor to Wallace-Murray Corporation, New York, N.Y.

Filed Aug. 25, 1975, Ser. No. 607,508

Int. Cl.² F16D *35/00*

U.S. Cl. 192—58 B **7 Claims**



1. A fluid coupling of the type adapted for use to drive a fan for the radiator of an internal combustion engine, said coupling including relatively rotatable disc and housing members, said disc and housing having a common axis of rotation, said disc positioned within said housing, said disc on at least one face having a plurality of concentric lands which are positioned within mating concentric channels defined by concentric lands in said housing to thereby define interdigitated lands, said coupling adapted to contain a shear fluid to fill at least a portion of the clearance space between said lands and their corresponding channels for the purpose of transmitting torque, the improvement comprising, a pumping groove in the disc lands and a pumping groove in the housing lands, at least one of said pumping grooves being canted to thereby define a secant pumping groove.

4,004,669

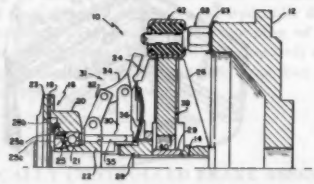
CLUTCH ASSEMBLY WITH FLOATER PLATE AND SHOCK CANISTERS

Zachary A. Roderick, Bethel Island, Calif., assignor to Galgon Industries, Inc., Fremont, Calif.

Filed Sept. 2, 1975, Ser. No. 609,234

Int. Cl.² F16D *13/46, 13/68, 3/70*

U.S. Cl. 192—70.17 **4 Claims**



1. In a drive train having a flywheel driven by an engine and a drive shaft coupled with a clutch assembly which includes at least a pair of pressure plates, the combination of an annular torque-transmitting floater plate adapted to be positioned co-axially between the pressure plates and about the drive shaft, means forming an opening in the floater plate co-axially with the drive shaft and radially spaced therefrom a distance which affords non-interfering clearance between the floater plate, pressure plates and drive shaft, with no portion of said pressure plates extending into a plane which includes the floater plate, means forming a plurality of circumferentially spaced arcuate sockets in the outer periphery of the floater plate with the longitudinal axis of each socket being generally

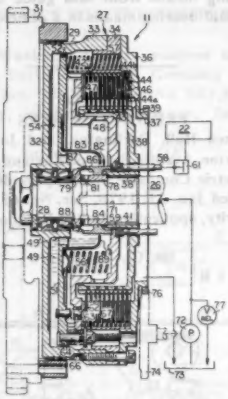
parallel with the axis of rotation of the floater plate, a shock absorber unit mounted co-axially in each socket, each shock absorber unit including an elongate member having an axial bore and formed of an elastomeric material which is capable of resiliently absorbing shock forces transmitted from the flywheel to the clutch assembly upon interengagement therebetween, housing means enclosing each elongate member, said housing means comprising an annular shell having an outer diameter commensurate generally with the diameter of the sockets, each shell being mounted for axial sliding movement within a respective socket and with each elongate member being mounted co-axially within a respective shell, and mounting means extending axially through the bore of each elongate member for mounting the same for rotation with the flywheel.

4,004,670

SELF-MODULATED CLUTCH WITH DRAG-REDUCTION VALVE

Karl A. Nerstad, Peoria; Franklin O. Koch, Jr., and Curtis E. Chadwick, III, both of Edelstein, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed July 9, 1975, Ser. No. 594,475
Int. Cl.² F16D *37/00, 13/72*
U.S. Cl. 192—105 A **6 Claims**



1. A self-modulating clutch for transmitting drive from an engine to a driven load comprising:

a rotary input member and a rotary output member,

a plurality of clutch discs including at least one disc coupled to said input member for rotation therewith and including at least one other disc coupled to said output member for rotation therewith,

a pressure plate disposed adjacent said discs and being movable to apply clutch-engagement pressure to said discs and being retractable from said discs to disengage said clutch,

self-modulating means forming a lubricant fluid-entrapping chamber within said clutch wherein a fluid pressure is developed from centrifugal effects, the magnitude of said fluid pressure being dependent on the rotational speed of said input member, and including a clutch capacity-modifying member exposed to said fluid pressure and movable thereby,

at least one disengagement spring acting on said capacity-modifying member in opposition to said fluid pressure thereon.

at least one engagement spring disposed between said capacity-modifying member and said pressure plate to apply increasing engagement pressure to said discs through said pressure plate when said capacity-modifying member moves in response to increasing fluid pressure in said chamber,

passage means for supplying a flow of lubricant fluid to said clutch,

valve means for reducing said lubricant flow when said clutch is disengaged, wherein said valve means continues to admit a reduced flow of said lubricant into said clutch while said clutch is disengaged, and

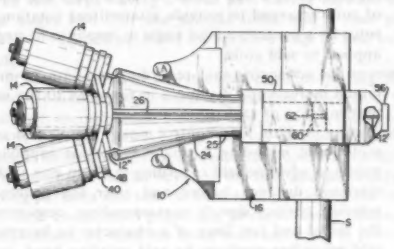
a fluid-retainer communicated with said chamber of said self-modulating means and positioned to receive said restricted flow of lubricant fluid whereby a reserve of said lubricating fluid is available to said self-modulating means upon expansion of said chamber thereof in the course of re-engagement of said clutch.

4,004,671

WIRE MATRIX PRINT HEAD

Nicholas Kondur, Jr., Riverton, Wyo., assignor to LRC, Inc., Riverton, Wyo.

Filed Dec. 16, 1974, Ser. No. 532,870
Int. Cl.² B41J *3/05*
U.S. Cl. 197—1 R **18 Claims**



1. A wire matrix print head adapted for use with matrix printer apparatus comprising:

a plurality of elongated print wires having leading ends arranged in closely spaced relation to one another normal to and in confronting relation to a print medium, said print wires diverging away from said leading ends and from one another each along a predetermined corresponding path of curvature,

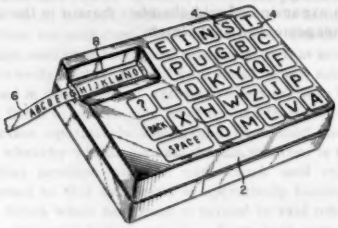
a plurality of actuators, each actuator affixed to one of said print wires to drive its associated print wire forwardly toward the print medium, and to effect return of said print wire in a rearward direction away from the print medium, and

guide wire means defining an elongated open polygonal support interposed between said actuators and the print medium to guide each of said print wires for rearward divergent extension in which at any given location along the substantial length of said print wires rearwardly of their leading ends said print wires are disposed at equally displaced included angles with respect to adjacent wires but at unequal distances apart to define the corners of a polygon having sides of unequal length in an imaginary plane passing through the print wires transversely of their leading ends, each of said print wires being unconfined along their substantial length and being guided by said guide wire means for advancement along a corresponding path of curvature as they are driven forwardly into the print medium.

4,004,672
PRINTING CONTROL DEVICE

Reiji Hirano; Takayoshi Hanakata, both of Yokohama, and Matsutoshi Ito, Narashino, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 20, 1975, Ser. No. 551,397
Claims priority, application Japan, Feb. 22, 1974, 49-21686; Feb. 22, 1974, 49-21684; Feb. 12, 1975, 50-17671
Int. Cl.² B41J *3/20*, *19/00*; G05B *19/40*
U.S. Cl. 197—1 R 7 Claims



1. A printing control device for use in a portable electronic apparatus comprising:

a printing head fixedly disposed at a printing position and arranged to print a character on a tape-form recording medium, portions of said character being selectively printed along predetermined lines on said recording medium;

means including a step motor having a rotor and a plurality of coils arranged to provide intermittent rotation of said rotor by a predetermined angle in response to step pulses applied to said coils;

means for advancing said recording medium by predetermined incremental distances in response to the intermittent rotation of said rotor; and

recording medium feed control means coupled to said step motor and including a ring counter for supplying step pulses to advance said recording medium one said predetermined distance before and after the generation of printing control signals corresponding, respectively, to the initial and last lines of a character to be printed on said recording medium by said printing head, said step pulses including a first step pulse being operative to align the position of said rotor of said step motor means at a start position prior to the commencement of printing of said character on said recording medium by said printing head.

4,004,673
WIRE MATRIX PRINTHEAD HAVING FACILITY FOR ENABLING WIREWEAR CORRECTION

Karl H. Burzlaff, Danville, and Carmelo Sanchez, Castro Valley, both of Calif., assignors to The Singer Company, New York, N.Y.

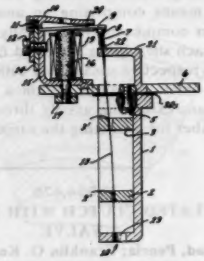
Continuation of Ser. No. 482,917, June 25, 1974, abandoned. This application Aug. 15, 1975, Ser. No. 604,964
Int. Cl.² B41J *3/04*
U.S. Cl. 197—1 R 4 Claims

1. In a wire matrix printing head comprising a guide assembly for retaining a plurality of wire styli each of which styli has an input end for receiving an impact and an output end for delivery of an impact to a recording medium, said assembly having guide means adjacent one end thereof for holding and aligning the input ends of said wire styli and with electromagnetic activation means for delivering motion and velocity to selected ones of said plurality of styli, and output bearing means located adjacent the other end of said assembly to hold the output ends of said wire styli, the combination wherein:

said output bearing means includes a plurality of apertures with each aperture having its axis in alignment with an axis of one of said wire styli,

said output bearing means providing a planar face on one side thereof with the tips of the wire styli flush with said planar face, and

means movably mounting said bearing means to said guide assembly to enable altering of the position of said output bearing means and said planar face along the longitudinal



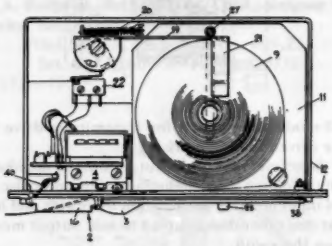
length of said styli and in relationship to the output end tips of said wire styli,

said movable mounting means including means for releasing said bearing means from said guide assembly and for securing said bearing means in a desired position on said assembly.

4,004,674
PRINTING DEVICES

Godfrey Stephen Hall, Darlington, and John Harwood Leworthy, Newton Aycliffe, both of England, assignors to The General Electric Company Limited, London, England

Filed Jan. 21, 1976, Ser. No. 651,191
Claims priority, application United Kingdom, Jan. 22, 1975, 2763/75
Int. Cl.² B41J *1/18*
U.S. Cl. 197—1 R 4 Claims



1. A printer for a tape which constitutes an elongated web, said printer comprising:

a. a support structure,

b. tape carrier means to carry a spool of tape to be printed,

c. means to mount said tape carrier means on said support structure for movement between a working position and a position which permits a replacement spool of tape to be fitted,

d. releasable latch means which is carried by said support structure to retain said tape carrier means in its working position and about which there is some freedom for pivotal movement of the tape carrier means,

e. means to advance tape drawn from a spool of tape carried by said tape carrier means in its working position through a printing station at which the tape is movable in a plane,

f. an anvil which has a rectilinear edge,

g. structural means which carries said anvil and which is pivotted to said support structure for movement between

a working position in which said rectilinear edge lies adjacent to and to one side of said plane at the printing station and is retained in that position by engagement with said tape carrier means when in its working position at a point remote from said latch means and a position which facilitates threading of replacement tape through the printing station,

h. an electromagnetic printer unit having a plurality of metal strips each having and end portion that constitutes a printing element,

i. means to mount said printer unit on said support structure to lie on the opposite side of said plane to said anvil with the printing elements facing the rectilinear edge of the anvil when in its working position, and

j. spring means which co-operates with said support structure and said tape carrier means when in its working position to apply a force to the tape carrier means at a point spaced from said latch means and on the opposite side of the latch means to that at which the tape carrier means engages said structural means carrying said anvil so that the anvil is urged towards said printing elements thereby providing a resilient mounting for the anvil which permits some movement thereof upon operation of the printing elements.

4,004,675

TABULATOR DEVICE FOR TYPEWRITERS AND THE LIKE

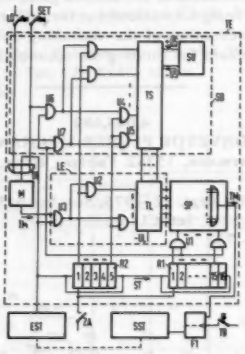
Martin Ludwig, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Jan. 23, 1975, Ser. No. 543,526

Claims priority, application Germany, Jan. 25, 1974, 2403653

Int. Cl.² B41J *25/18*

U.S. Cl. 197—176 **2 Claims**



1. In a tabulator device for typewriters, particularly for teleprinters or data-printers, in which tabulation marks are set, cancelled and recalled, the combination of a semiconductor store having electronically operable storage elements, arranged in the form of a matrix having a plurality of rows and columns, in which the tabulation marks are stored, said storage elements being operative to retain their respective contents independently of the operating voltage thereto, register means which operatively contains the addresses of the particular actuated storage elements, means, including a write-in control unit, operatively connected with said store and register means for selectively writing the tabulation marks into the store or cancelling the same therefrom, said register means comprising a pair of registers, one for row designation and the other for column designation, cooperable to supply the addresses to said store for designating the respective storage elements thereof, and means, including a read-out control unit, operatively connected with said store and register means for reading tabulation marks out of said store.

4,004,676

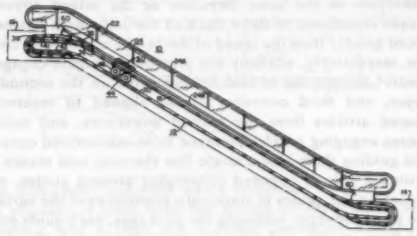
ESCALATOR WITH NON-JAMING STEP

Joseph K. Kraft, Gettysburg, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed July 17, 1975, Ser. No. 596,794

Int. Cl.² B66B *9/12*

U.S. Cl. 198—326 **16 Claims**



1. A moving stairway extending between upper and lower landings, comprising:

a plurality of similar steps disposed to travel between the landings in a load bearing run,

motive means,

said motive means being operable to cause said steps to descend and change from step mode to platform mode near the end of the load bearing run,

and first and second stairway skirt boards disposed at opposite sides of the steps,

each of said steps having a tread part having forward and rear edges and first and second sides, and a riser part which is disposed adjacent the forward edge of said tread part,

each of said steps having first and second projecting portions disposed at the forward edge thereof adjacent to the first and second sides, respectively, which extend outwardly past the forward edge portion of the step which extends between said first and second projecting portions, forming obtuse angles between the first and second projecting portions and said forward edge portion of the step, said first and second projecting portions being cooperatively formed by both the tread and riser parts to provide a fillet between the riser part and the first and second stairway skirt boards.

4,004,677

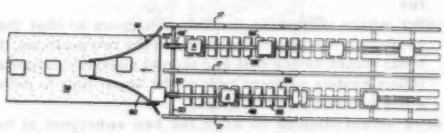
LINE COMBINING APPARATUS

Robert J. Heier, Whitehouse, Ohio, and Wayne E. Pettibone, Woodridge, Ill., assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed July 30, 1975, Ser. No. 600,248

Int. Cl.² B65G *47/26*

U.S. Cl. 198—452 **7 Claims**



1. A package handling apparatus for combining a plurality of lines of packages into a single line comprising plural infeed conveyors each supporting a line array of randomly spaced package articles, means connected to drive the infeed conveyors at the same speed in a common direction, individual endless finger chains for each infeed conveyor, each said chain carrying plural fingers spaced along the chain an amount at least two times said package article length, means supporting

each of said individual chains adjacent the end of the infeed conveyors such that along its upper reach of said path the fingers thereof protrude above the infeed conveyor surface level for engaging packages thereon, a second conveyor span adjacent the downstream end of each infeed conveyor and at a level relative to said infeed conveyor for transferring package articles from the former to the latter and supporting them on the latter throughout its travel below the level of the protruding fingers, means connected to drive each of the second conveyors in the same direction as the infeed conveyors, means connected to drive each of the individual chains at a speed greater than the speed of the infeed and second conveyors, respectively, whereby the protruding fingers engage and control the spacing of said articles while on the second conveyor, and third conveyor means aligned to receive said spaced articles from the second conveyors, and including means engaging articles received from said second conveyors and guiding them into a single line thereon; said means comprising a pair of opposed converging arcuate guides, means mounting the guides in stationary position over the surface of the third conveyor receiving the packages, each guide extending from its one end near the downstream end of a second conveyor to overlie the third conveyor and its other end in a spaced apart relationship from the other opposite guide defining a single package outlet passage for guiding packages delivered from the individual second conveyors along the third conveyor toward each other and funnel the packages through the outlet in a single line on the third conveyor.

4,004,678

CONVEYOR SYSTEMS

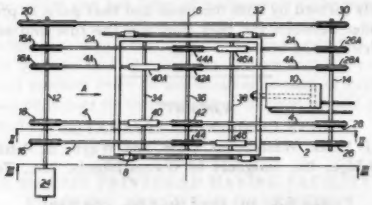
Peter D. Hardy, Welwyn Garden City, England, assignor to Metal Box Limited, Reading, England

Filed July 17, 1975, Ser. No. 596,752

Claims priority, application United Kingdom, July 19, 1974, 32033/74

Int. Cl.² B65G *47/26*

U.S. Cl. 198—460 **8 Claims**



1. A conveyor handling system for transporting articles from a first position to a second position, comprising

first and second endless conveyors each defining an upper run

roller means supporting the two conveyors so that their upper runs extend in series between the two positions, the roller means having first and second coaxially supported rollers guiding adjacent ends of the upper runs to define a line junction between them,

drive means coupled to drive the two conveyors at two respectively different speeds, means responsive to the approach of an article to the junction between the two conveyors at which the article is transferred from one conveyor to the other to provide an actuation signal,

and actuation means responsive to the actuation signal and connected to the first and second rollers to displace said junction without altering the speeds of the two conveyors and in a sense to accelerate the transfer of the articles between the two conveyors.

4,004,679

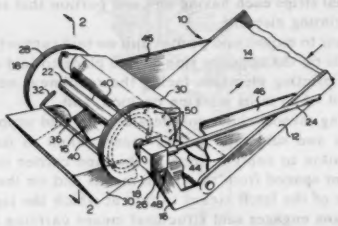
MECHANICAL SHOVELS

Steven Charles Lenkey, P.O. Box 922, Hamilton, Ontario, Canada (L8N 3P9)

Filed Apr. 18, 1975, Ser. No. 569,505

Int. Cl.² B65G *65/04*

U.S. Cl. 198—509 **5 Claims**



1. A mechanical shovel comprising a frame, a first cam member rotatably mounted by the frame about an axis and providing an endless bucket-attitude controlling cam track having the said axis within its perimeter, means for adjustably fixing the position of the first cam member about the said axis, a second guide member mounted for rotation about the said axis and providing a guide slot extending radially with respect to the said axis, at least one bucket having an open front end and having a rearward extension by which it is pivoted to the second guide member so as to be rotatable therewith about the said axis, and a cam follower on the bucket between its pivot and said open front end, engaging the said cam track and the guide slot and cooperating therewith to hold the bucket with its open front end in shovelling attitude and to move it in a shovelling action parallel to a surface over which the shovel extends upon rotation of the second guide member, the first cam member being rotatable about the said axis of rotation to change the inclination of the shovelling action of the said bucket, and means for rotating the second guide member.

4,004,680

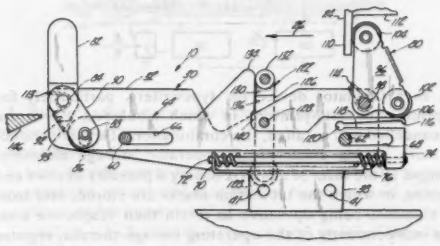
CONVEYOR PUSHER MECHANISM

Bruno D. Warmann, 15362 Fairlane Drive, Livonia, Mich. 48154

Filed Sept. 22, 1975, Ser. No. 615,398

Int. Cl.² B65G *19/00*

U.S. Cl. 198—732 **13 Claims**



1. A conveyor including a support for providing a path along which trays are movable in a forwarding direction, each tray being drivingly engageable by one of a plurality of pusher members carried by a chain supported on a track located adjacent to the tray support, each pusher member being rotatably mounted on a housing attached to the chain and movable therewith, each pusher member being movable between driving and non-driving positions relative to the tray, wherein the improvement comprises:

a connecting member mounted on the housing for reciprocal movement with respect to the pusher member to control the movement of the pusher member between the driving and non-driving positions relative to the tray;

means urging the connecting member into a contacting engagement with said pusher member to urge said pusher member to an operative relation with a tray in which the pusher member is drivingly engageable;

a control member pivotably mounted on the housing in advance of the pusher member with relation to the forwarding direction of tray movement, said connecting member connecting the control member to said pusher member such that, when the control member is engageable with an object such as a preceding tray overtaken by the control member, the control member is movable in response to such engagement to cause the connecting means to move to a non-contacting relationship with the pusher member whereby the pusher member moves to a non-driving position;

a second control member operable independently of said first-mentioned control member for moving said connecting member out of a contacting engagement with said pusher member; and

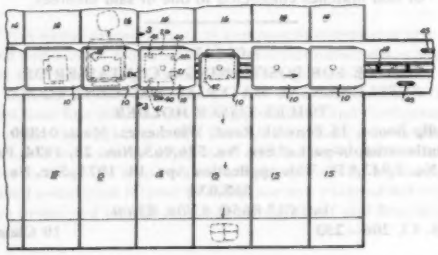
barrier means mounted adjacent to a portion of the chain-supporting track and momentarily engageable with said second control member such that said second control member lockingly engages said connecting member to move the same in a non-contacting position with respect to said pusher member whereby said pusher member is moved to said non-driving position, said second control member remaining in contact with said connecting member after said momentary engagement with said barrier.

4,004,681

TILTING TRAY SORTING SYSTEM

Merle E. Clewett, Frederick, and Seymour Henig, Kensington, both of Md., assignors to American Chain & Cable Company, Inc., Bridgeport, Conn.

Filed Apr. 5, 1976, Ser. No. 673,793
Int. Cl.² B65G *47/38*
U.S. Cl. 198—796 **37 Claims**



1. In a tilting tray sorting system, the combination comprising

a plurality of carriages,

a track,

a driving means for moving said carriages along said track,

each said carriage comprising a tray,

means for supporting said tray on its carriage for swiveling movement about a vertical axis and tilting movement about a horizontal axis,

means for holding said tray in normal generally horizontal position on said carriage,

means along the path of said carriages for engaging and moving said trays such that they swivel about the vertical axis and tilt about the horizontal axis to deliver an article to one or more positions along the path of the carriages,

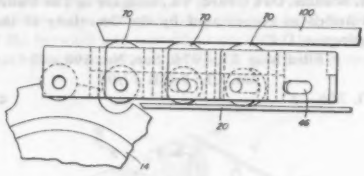
and means along the path of the carriages for returning said trays to their normal position.

4,004,682

TYPE S CHAIN

Stephen H. Schuler, Brighton, Mass., assignor to Adamation, Inc., Newton, Mass.

Filed Aug. 14, 1975, Ser. No. 604,728
Int. Cl.² B65G *17/00*
U.S. Cl. 198—852 **9 Claims**



1. A dishwasher conveyor which comprises:

a. a plurality of links, each link having an upper and lower surface and a yoke and a collar connected integrally therewith; the collar adapted to be rotatably received within the yoke of a next successive link; the collar of the link including opposed slots which define the limits of relative oscillatory movement about a first axis between the collar and the next successive link; and wherein the collar of one link includes an opening adjacent to an opening of the collar of the next successive link to allow maximum pivotal movement therebetween about a second axis and wherein the openings define a recess which recess receives the tooth of a sprocket;

b. a sleeve rotatably received within the collar of the yoke, the sleeve having an upper domed surface which extends beyond the upper surface of the link;

c. a wheel-like roller having a hole in the center thereof received in the sleeve and extending below the lower surface of the link; and

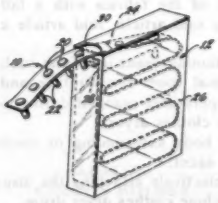
d. means to secure the collar of one link to the yoke of the next link and the sleeve and the roller to the collar portion, the secured links adapted for relative oscillatory motion one to the other about the first axis, which motion is limited by the slots in the collar and for pivotal motion about the second axis.

4,004,683

PACKAGING FOR POWER LOADS

Raymond V. Pomeroy, Portland, and Lewis A. Scott, Lake Oswego, both of Oreg., assignors to Omark Industries, Inc., Portland, Oreg.

Filed May 7, 1975, Ser. No. 575,446
Int. Cl.² B65G *15/00*; **B65H** *5/28*; **F42B** *39/08*
U.S. Cl. 206—3 **2 Claims**



1. Packaging for power load cartridges for powder actuated tools comprising; a flat elongate strip, power load cartridges having a head and a shank, attaching means attaching the heads of the cartridges to the strip with the shanks extending from one side of the strip, said attaching means permitting the shanks to be inserted into the cartridge receiving chamber of a powder actuated tool and in the inserted position permitting the strip to be peeled away from the head of the cartridge, a container for said cartridge bearing strip having an opening

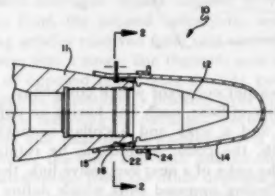
through which the strip and cartridges can be incrementally removed by the tool operator, and holding means on said container continuously resisting removal of the cartridge bearing strip to prevent inadvertent spillage.

4,004,684

FUZE PROTECTOR CAP

John A. Scollins, Oak Grove, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 27, 1976, Ser. No. 690,449
Int. Cl.² F42B *37/00*
U.S. Cl. 206—3 **4 Claims**



1. A cap for protecting fuzes on projectiles during storage and handling, said projectiles being provided with a circumferential fuze setting groove, comprising:

a deep drawn cup having the open end thereof flared to mate with the ogive of the projectile;

at least three slots circumferentially spaced on the wall of said cup; and

a snap ring having at least three lips adapted to project into said slots and engage the fuze setting groove on the fuze for retaining said cup on the projectile.

4,004,685

TREATMENT OF FABRICS IN MACHINE DRYERS

William G. Mizuno, and Iris N. Henderson, both of St. Paul, Minn., assignors to Economics Laboratory, Inc., St. Paul, Minn.

Filed Mar. 7, 1972, Ser. No. 232,432
Int. Cl.² B44D *1/46*; B05C *11/12*; E01B *29/04*; F26B *3/00*
U.S. Cl. 206—.5 **8 Claims**

1. An article for conditioning fabrics in a machine clothes dryer by contact of the fabrics with a fabric-conditioning agent supplied by said article, said article characterized by having:

a. fabric conditioning agent in a form such as a bar that is solid at normal room temperature and softens at the elevated temperatures reached during normal operation of a machine clothes dryer;

b. a dispenser body surrounding or enclosing the fabric conditioning agent;

c. means for selectively attaching the dispenser body to a wall of a machine clothes dryer drum;

d. a permeable surface of said dispenser body through which only a small amount of said enclosed fabric conditioning agent can pass when it is softened by heating of said article in a dryer, thereby allowing the enclosed fabric-conditioning agent to act as a long lasting reservoir for fabric conditioning agent which, after it passes through the permeable surface, is transferred to the fabric being treated by contact between the fabric and the permeable surface of the article; and

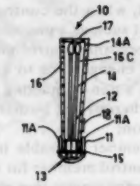
e. said article being capable of substantial re-use in conditioning different batches of fabric without replenishing the fabric conditioner of paragraph "a" hereof.

4,004,686

MATCH BOOK

Francis M. Hutchinson, 460 Elm St., Stratford, Conn. 06497

Filed Nov. 28, 1975, Ser. No. 636,085
Int. Cl.² A24F *27/00*
U.S. Cl. 206—104 **4 Claims**



1. A match book comprising,

a substantially U-shaped base member having opposed leg portions,

a row of matches secured to said base member between said opposed leg portions,

said matches extending beyond the opposed leg portions of the said base member,

a cover member detachably connected to said base member,

said cover member defining an enclosure for encasing the matches,

said cover member including opposed side walls, interconnected end walls, and a top wall for encasing said matches,

said cover member being frictionally secured to said base member by insertion of the lower portion of said side walls between the leg portions of said base member and said row of matches disposed therebetween,

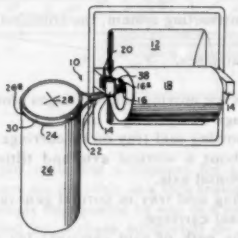
and means defining a striking element for effecting ignition of said matches connected to one of said member.

4,004,687

DEVICE FOR POSITIONING A CONTAINER OF SUPPLEMENTAL MATERIAL ADJACENT TO A TOILET-TISSUE HOLDER

Philip Boone, 15 Fenwick Road, Winchester, Mass. 01890

Continuation-in-part of Ser. No. 526,963, Nov. 25, 1974, Pat. No. 3,943,859. This application Apr. 14, 1975, Ser. No. 568,034
Int. Cl.² B65Q *83/04*, *85/00*
U.S. Cl. 206—233 **10 Claims**



1. An improved device for positioning a container of health care material adajcent to a standard toilet-tissue roll holder, said holder including a principal body component and a pair

of forwardly projecting posts, each of said posts having upper, lower and side surfaces and a bore formed to receive a spindle of a toilet-tissue roll, said improved device comprising:

a container with health care material therein;

an aperture in said container enabling said material to be released;

a rigid unitary arm member positioning said container with respect to said holder;

angular slide-on fastening means integral with one extremity of said arm member which substantially encircles and firmly grips one of said posts and which determines the position in which said arm member extends;

means to fixedly position said fastening means along said post;

support means integral with the other extremity of said arm member to bear said container; and

means on said container to releasably engage said support means and prevent inadvertent displacement, said container being removable without adjusting any of said holder, fastening means, arm member, or support means.

4,004,688

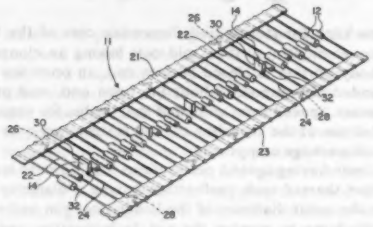
RADIAL LEADED ELECTRICAL COMPONENTS DESIGNED FOR AUTOMATIC INSERTION INTO PRINTED CIRCUIT BOARDS

Denver Braden, San Diego, Calif., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed July 10, 1975, Ser. No. 594,929

Int. Cl.² B65D *73/02*

U.S. Cl. 206—330 **12 Claims**



1. A radial leaded electrical component comprising at least first and second radial leads which project outwardly in opposite directions along substantially a straight line and which lie in substantially the same plane, a first deformation in said first lead, said first deformation being positioned and configurated to insure the application of a first adhesive band over said first deformation and the application of a second adhesive band over said second lead retains said component in a predetermined orientation relative to said plane and a second deformation positioned on said first lead outwardly of said first deformation.

4,004,689

ARTICLE CARRIER

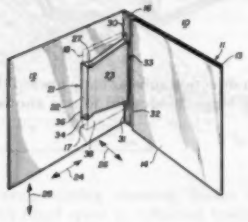
Don Leon Glasell, 331 Kedzie St., Evanston, Ill. 60202

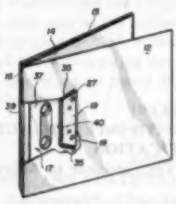
Filed Oct. 10, 1972, Ser. No. 296,485

Int. Cl.² B65D *85/67*; **B42D** *3/00*

U.S. Cl. 206—387 **3 Claims**

1. A display holder for a tape cassette or the like comprising a book-like folder body including front and rear cover portions and a bright portion interconnecting said cover portions, said front cover and bight portion having a pair of cuts formed therethrough generally normal to the bight portion and folding axes of said front and rear cover portions relative to the bight portion, corresponding ends of said cuts terminating within the front cover a substantial distance from the bight portion and the other corresponding ends of the cuts terminating adjacent said rear cover of the folder body, and a cassette embracing sleeve element integral with the folder body formed by said cuts and having top and bottom edges and a forward end hingedly joined with said front cover at the ends of the cuts which terminate in the front cover, the sleeve element having an opposite end hingedly joined with the folder body at the other corresponding ends of said cuts, and the sleeve element having a folding line spaced somewhat rearwardly of the forward end of the sleeve element by an amount approximately equal to the thickness of a cassette or the like to be held, and said folding line parallel to the hinge axes of the forward and rear cover portions, the arrangement being such that a cassette or the like is insertable beneath the





sleeve element with one face of the cassette lying against the interior of the front cover and its opposite face lying under the sleeve element with the sleeve element folded on said folding line and offset rearwardly of the front cover, said one face of the cassette viewable through the front cover in the area between said cuts, and said cuts defining abutments on the front cover adapted to engage opposed edges of the trapezoidal protrusion on a cassette and thus to arrest movement of the cassette toward the top or bottom of the folder body, the sleeve element and said bight portion of the folder body preventing movement of the cassette away from the bight portion and away from the interior of the front cover.

4,004,690

COUPON HOLDER

Ninfa R. Giarritta, San Francisco, Calif., assignor to Lawrence Peska Associates, Inc., New York, N.Y.

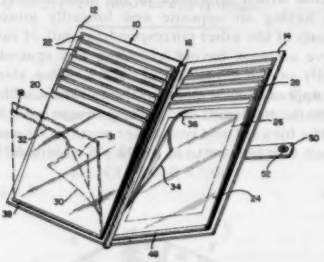
Filed Aug. 20, 1975, Ser. No. 606,320

Int. Cl.² B65D *85/00*

U.S. Cl. 206—425 **10 Claims**

1. A coupon holder for classifying coupons and for presenting coupons readily for manual dispensing comprising opposable panel support means, said panel means hingedly secured to one another, transparent pocket means hingedly secured to

each panel, opening means in said pocket means for inserting and withdrawing coupons from said pocket means, said open-



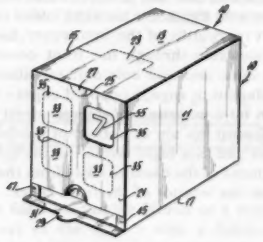
ings facing in a direction substantially toward the edges of said panels that are hingedly secured to one another.

4,004,691

GLOVE PACKAGE BOX WITH INTERCHANGEABLE IDENTIFICATION

Allen Wihksne, Fort Worth, Tex., assignor to Arbrook, Inc., Arlington, Tex.

Filed Dec. 22, 1975, Ser. No. 643,442
Int. Cl.² B65D *5/72, 83/00*
U.S. Cl. 206—459 **7 Claims**



1. A box with interchangeable identification including a rectangular enclosure having four walls, a bottom closure at one end of said rectangular enclosure and an identification closure at the other end thereof, said identification closure comprising:

first means for making available for display, exclusively, a first plurality of symbols, this plurality being a portion of the total symbols available, said means being attached to two said opposing walls of said rectangular enclosure;

second means for making available for display, exclusively, a second plurality of symbols, this plurality being the remaining portion of the total symbols available, said means being attached to a wall of said rectangular enclosure adjacent to said first means attachment; and

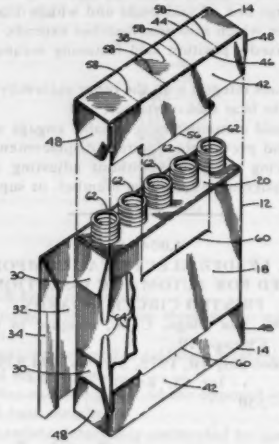
means connected to said remaining of said rectangular closure walls for selectively displaying one of said symbols made available.

4,004,692

COT DISPENSER

James A. Burns, Elizabeth, N.J., assignor to Becton, Dickinson and Company, East Rutherford, N.J.

Filed Feb. 23, 1973, Ser. No. 335,360
The portion of the term of this patent subsequent to Jan. 25, 1992, has been disclaimed.
Int. Cl.² B65D *83/00, 85/62*
U.S. Cl. 206—486 **13 Claims**



1. A package for storing and dispensing cots of the type used to cover medical probes, said cots having an elongated tubular body portion, a closed bottom end, an open top end and a beaded rim disposed about the open end, said probe having means, spaced from an end of said probe, for engaging the beaded rim of the cot when the cot is stretched over said probe, said package comprising:

a container having spaced perforations formed in at least a portion thereof each perforation having a diameter less than the outer diameter of the beaded cot rim and sufficiently large to receive the cot body portion and the probe so that the cots may be suspended in said perforations, said container being of sufficient size so that the probe may be inserted a sufficient distance into the cots to allow engagement of the beaded rim by the engagement means;

cover means for enclosing the perforations, said cover means being mounted to said container; and

means associated with said cover means for exposing the perforations so that cots suspended in said perforations may be removed by inserting said probe and engaging the beaded rim with said engaging means.

4,004,693

APPARATUS FOR INSPECTING THE DISPOSITION OF STEEL PLY CORDS IN PNEUMATIC TIRES

Naotaka Tsuji, and Koji Yamada, both of Kodaira, Japan, assignors to Bridgestone Tire Company Limited, Kyoba, Japan

Filed Apr. 23, 1975, Ser. No. 570,796
Claims priority, application Japan, May 9, 1974, 49-51666
Int. Cl.² B07C *5/04, 5/08*
U.S. Cl. 209—81 R **9 Claims**

1. An apparatus for automatically insecting the disposition of reinforcing steel ply cords in pneumatic tires, comprising in combination:

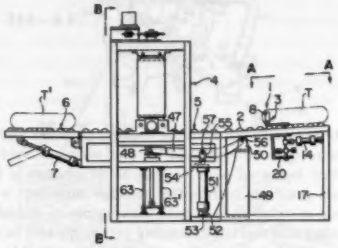
a tire feeding mechanism for feeding tires one by one toward a predetermined position on said apparatus;

a tire retaining mechanism having a rim member split into upper and lower halves for rotatably retaining a tire in an inspecting position;

a rotational driving mechanism mechanically connected to said rim member for rotatingly driving the same;

cord disposition detecting means including a carriage mounted on a machine frame so as to be movable toward and away from said inspecting position, and electric detectors mounted on said carriage to be movable toward and away from respective inspecting positions facing opposite side wall portions of said tire;

tire size detecting means comprising a cam shaft, an arm member securely mounted on said cam shaft and rotatingly movable toward a tread surface of a tire in said predetermined position, a number of cam plates securely mounted on said cam shaft and having angularly displaced cam surfaces relative to the axis of said cam shaft, and a number of limit switches securely mounted on a machine frame opposingly to said cam plates, said cam plates actuating said limit switches in a number corresponding to an angle of rotational movement of said arm



member to produce a signal indicative of the size of said tire, and a limit mechanism for limiting the movement of said cord disposition detecting carriage, said limit mechanism comprising a plate member securely mounted on said carriage and having a number of consecutively stepped surfaces and a number of limit switches securely mounted on a machine frame opposingly to said consecutively stepped surfaces of said plate member so as to produce a step signal for stopping said cord disposition detecting carriage upon a specified distance movement thereof as determined by the tire size detecting means signal;

electric control circuit means connected to said electric detectors for producing a disqualifying signal upon detection of an irregularity in the disposition of the steel ply cords in said tire; and

classifying means for distinguishing a disqualified tire from qualified ones.

4,004,694

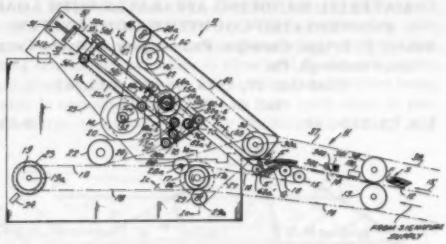
EXTRACTOR ASSEMBLY FOR EXTRACTING AND/OR DIVERTING A SELECTED NUMBER OF SIGNATURES FROM A STREAM

Christer A. Sjogren, Miami, Fla., assignor to Eds Inc., Hialeah Gardens, Fla.

Filed Oct. 2, 1975, Ser. No. 618,815
Int. Cl.² B07C *5/342*
U.S. Cl. 209—111.7 R **20 Claims**

1. A method for separating at least one signature from a stream of signatures moving in a forward feed direction from an upstream location along a conveying path having a main path and a branch path selectively movable towards the main path for conveying a stream of signatures, weekly journals, brochures or the like, which are arranged in overlapping fashion and have spines facing forward and in the downstream direction of the main path, said signatures each having a bottom and a top surface whereby each bottom surface engages the top surface of the preceding adjacent downstream signature and each top surface engages the bottom surface of the succeeding adjacent upstream signature, the spines of each signature being a spaced distance from the spines of adjacent upstream and downstream signatures, the branch path being provided with a stationary and a reciprocating shunting devices as well as a withdrawing device having engaging belts, the method of comprising the steps of:

leading the signatures around a bend so that the spine of each signature is caused to lift away from the engaging top surface of the preceding adjacent downstream signature to form a gap between the lifted spine and the top surface of the preceding adjacent downstream signature;



moving the reciprocating shunting device into said gap whereby the lifted spine is deflected towards and along the withdrawing device and between the engaging belts; and

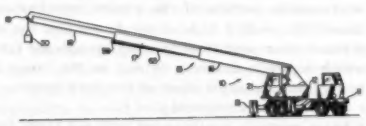
rapidly withdrawing the reciprocating shunting device away from said gap as the deflected signature moves between the engaging belts by means of a quick backward snatching of the withdrawing device while the extracted signature continues to move between the belts of the withdrawing device.

4,004,695

CHANNEL AND PLATE TELESCOPIC CRANE BOOM

John L. Hockensmith, Chambersburg, and John L. Grove, Greencastle, both of Pa., assignors to Fulton Industries, Inc., McConnellsburg, Pa.

Filed Apr. 16, 1975, Ser. No. 568,665
Int. Cl.² B66C *23/04*
U.S. Cl. 212—144 **8 Claims**



1. An extensible telescopic boom for a crane or the like comprising:

a first inner tubular boom section adapted for support on a vehicle, and a second outer tubular boom section telescopically in said inner boom section, said sections supporting a load support,

each said section including an upper U-shaped one piece bent plate channel shaped member providing sides and a top of uniform thickness, and a plate joined to said channel member providing the bottom of the tubular boom section, said plate having a greater thickness than said channel member, the width of the plate being larger than the distance between the outside surfaces of the sides of said channel shaped member substantially only enough to provide support for welding material, welding material deposited and joining the bottom portion of said side channel shaped member to said plate and positioned at the outer surface of each said side, there being sufficient welding material to achieve required structural strength, and

laterally spaced wear-pads carried by said inner tubular

boom section bottom plate each being adjacent a wall of said inner boom section and underlying a wall of said outer boom section, the outer edge of each said wear-pad being substantially in the plane of the outside surface of the said wall of the said outer boom section,

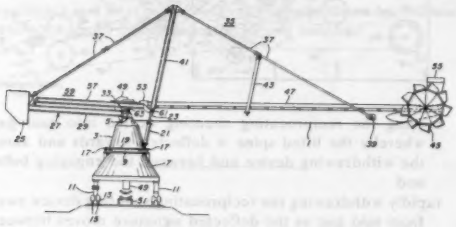
whereby said boom has adequate strength with reduced width and weight and without excessive bending of the boom section bottom plate.

4,004,696

MATERIAL HANDLING APPARATUS WITH LOAD COMPENSATED COUNTERWEIGHT SYSTEM

Aubrey C. Briggs, Carnegie, Pa., assignor to Dravo Corporation, Pittsburgh, Pa.

Filed Oct. 17, 1975, Ser. No. 623,362
Int. Cl.² B66C *23/72*
U.S. Cl. 212—49 **9 Claims**



1. In material handling apparatus having: a boom pivotally supported at one end for movement in a vertical plane while maintaining an acute angle with the horizontal;

a strut pivotally supported at one end for movement in the same vertical plane as said boom although extending in the opposite direction, said strut also maintaining an acute angle with the horizontal;

a counterweight mounted near the free end of said strut;

a tension member connected between the counterweight and a point well out toward the free end of the boom to counterbalance at least a portion of the forward overturning moment generated by the boom with the moment generated by the counterweight; and

a frame extending generally upward to pivotally support an intermediate portion of the tension member at a height above the pivoted ends of the boom and the strut, said pivoted boom and strut forming an upward facing angle which tends to decrease in size as the boom begins to bend upon the application of live load thereto,

the improvement comprising:

a beam member cantilevered outward from the pivoted end of the boom in the direction of said strut, and

means coupling the strut to the outer portion of the cantilevered beam member to transfer a portion of the moment produced by the counterweight to the cantilevered beam as the live load on the boom is decreased and the angle between the pivoted boom and strut tends to increase.

4,004,697

VISUAL COUPLING INDICATOR FOR AUTOMATIC RAILWAY CAR COUPLERS

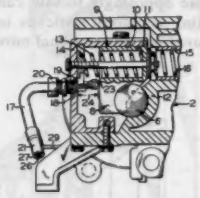
William B. Jeffrey, North Huntingdon, Pa., assignor to Westinghouse Air Brake Company, Wilmerding, Pa.

Filed Feb. 9, 1976, Ser. No. 656,316
Int. Cl.² B61G *3/10*
U.S. Cl. 213—75 R **8 Claims**

1. A visual coupling indicator for use with a railway car coupler comprising a casing for a mating head disposed axially parallel to the longitudinal axis of the car for mating with a counterpart mating head, said casing being of predetermined vertical dimension defined by upper and lower limits and having operably disposed therein a movable locking member biased to a locking position in which a coupling pin of the counterpart mating head is engaged for locking the mating heads in a coupled relation, and being operable to an unlocking position in which the coupling pin of the counterpart mating head is disengaged for releasing the coupled relation, said visual coupling indicator comprising:

a. a tubular member disposed externally of the casing with one end fixed to the side thereof adjacent to and in alignment with the line of movement of the locking member, said tubular member being curved such that the other end thereof extends beyond one of the upper and lower limits of the casing;

b. a flexible spring member having one end making separable abutting contact with the locking member and extending therefrom through said tubular member, said flexible member being of such length as to occupy a fully retracted position within the tubular member when the locking member is in its said locking position and to have the other end thereof extending exteriorly and beyond the other end of said tubular member into a visible position when the locking member is in its said unlocking position; and



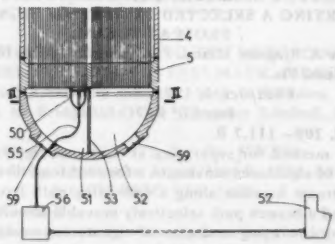
c. indicator biasing means effective, upon movement of the locking member to the locking position, for biasingly returning said flexible member to its said fully retracted position, and being yieldable to movement of the locking member to the unlocking position for effecting operation of the flexible member to its said visible position.

4,004,698

DEVICE FOR POSITIONING A MEMBER ON A TUBULAR PLATE

Bernard Gebelin, Courbevoie, France, assignor to Societe Franco-Americaine de Constructions Atomiques-Framatome, Courbevoie, France

Filed Dec. 2, 1975, Ser. No. 636,951
Claims priority, application France, Dec. 5, 1974, 74.39771
Int. Cl.² B25J *9/00*
U.S. Cl. 214—1 BB **7 Claims**



1. A carriage for selectively moving along a tubular plate guide tubes having members adapted to be introduced into tubes of the tubular plate, said carriage comprising: two crossed arms each carrying guide tubes; a guiding and connecting stirrup between said arms, guide means for permitting

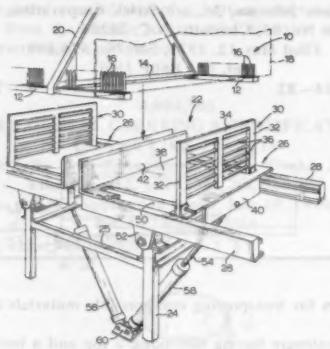
movement of each arm relative to the stirrup in a direction parallel to the tubular plate, in a longitudinal direction of the arm and in a direction perpendicular to the plate; means for controlling the movements of said arms relative to said stirrup; and said members comprising grappler fingers unitary with each of said arms and directed toward said tubular plate, said fingers comprising expansible mandrels with means for selectively causing their diameter to become greater or smaller than the diameters of the tubes of the plate.

4,004,699

METHOD AND APPARATUS FOR DISCHARGE HANDLING OF METAL SHEETS

Frederick Louis Connon, Erieau, and John Neil Stone, Kingsville, both of Canada, assignors to David Krofchak Limited, Cambridge, Canada

Filed July 9, 1975, Ser. No. 594,390
Claims priority, application Canada, May 29, 1975, 228413
Int. Cl.² B65G *57/28*
U.S. Cl. 214—6 C **9 Claims**



1. Apparatus for discharge handling of a plurality of sheets from a rack having means for supporting said sheets in a vertically disposed spaced apart position, consisting of a tiltable table, said sheet supporting means being large enough in plan dimensions to telescope over said table, means for telescopic lowering of said support means below said table to release said sheets onto said table, a vertically disposed stop on said table, an upstanding member on said table movable towards said stop on said release of the sheets to form a pack thereof against said stop, means for tilting said table, while said support means is below said table, until said stop with said pack is horizontal, and means for moving said pack from said horizontally disposed stop when said slidable member is moved away from said stop.

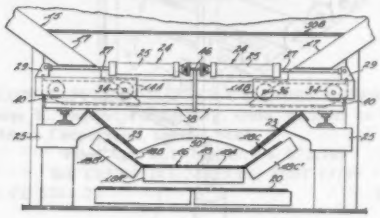
4,004,700

HOPPER GATE FOR SELF-UNLOADING SHIPS

Robert M. Empey, Ontario, Canada, assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Dec. 22, 1975, Ser. No. 643,312
Int. Cl.² B65G *67/58*
U.S. Cl. 214—15 D **8 Claims**

1. A belt feeder gate for discharging a bulk material from a given hopper of a hoppered ship hold or the like onto an unloading conveyor belt positioned in underlying relation to said feeder gate, and in which the given hopper has a downwardly tapered shape defined by a first pair of oppositely disposed hopper walls inclined longitudinally relative to the longitudinal path of travel of said conveyor belt and by a second pair of oppositely disposed hopper walls inclined laterally relative to the longitudinal path of travel of said conveyor belt, said given hopper being one of a plurality of similar hoppers positioned in overlying relation to said conveyor belt along the length of said conveyor belt, the oppositely disposed longitudinally inclined hopper walls of the given hopper defining with longitudinally inclined walls of hoppers lying contiguous the given hopper upstream and downstream of the given hopper relative to the travel of said conveyor belt a pair of longitudinally spaced hog ridges lying on either side of the given hopper, wherein the improvement comprises forming said belt feeder gate as two cooperating gate sections adapted when in closed position to close the discharge opening of said given hopper, said two gate sections being mounted for movement in a horizontal plane in a direction laterally of the path of travel of said conveyor belt, said two cooperating gate sections being movable in opposite directions toward and into abutting relation to each other to close said discharge opening of said given hopper, said two cooperating gate sections being movable in opposite directions away from each other to permit discharge of material from the discharge opening of said



given hopper, the respective opposite longitudinal end portions of each gate section being respectively in underlying relation to a corresponding one of said pair of longitudinally spaced hog ridges lying on either side of said given hopper, wheel means carried by each of said gate sections, stationarily mounted track means extending laterally of the longitudinal path of movement of said conveyor belt and adapted to be engaged by said wheel means to rollingly support each of said gate sections in its opening or closing movement, said cooperating gate sections when in open position having at least a substantial portion thereof stored externally of said given hopper and in underlying relation to the external surface of said walls of said given hopper which are inclined laterally relative to the longitudinal path of travel of said conveyor belt, power means operatively associated with each of said gate sections for imparting opening or closing movement to the respective gate sections, said power means being positioned in at least one of said hog ridges associated with said given hopper corresponding to said belt feeder gate.

4,004,701

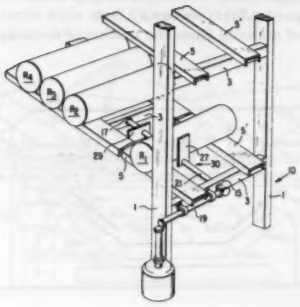
HANDLING AND DISPENSING SYSTEM AND APPARATUS FOR CYLINDRICAL OBJECTS

Daniel H. Moses, Fairfield, Ohio, assignor to Champion International Corporation, Stamford, Conn.

Division of Ser. No. 367,799, June 7, 1973, Pat. No. 3,951,276.
This application Dec. 24, 1975, Ser. No. 644,042
Int. Cl.² B65G *1/06, 59/00*
U.S. Cl. 214—16.4 A **4 Claims**

1. A space saving system for storing and handling cylindrical stock such as floor coverings and the like comprising a plurality of identical racks in rows so arranged as to define corridors between every two adjacent rows to admit an object carrying movable pallet to move between said rows along said corridor, said racks having a support structure sloping toward the working face of said rack facing said corridors for receiving and storing a plurality of pieces of cylindrical stock in serial order with the axes of the pieces parallel to each other and also to a plane passing through the working face of the rack, a first and second rotary retention means in the form of single thin blades radially extending from and fixed to a common rockable shaft

and having their wide faces traversed to said cylindrical stock on said rack engaging and holding said lowermost cylinder in said rack, said second retention means being displaced angularly at 90° to said first means and positioned inwardly in the face of the rack a distance at least equal to the diameter of one cylindrical article engageable with the next succeeding piece of cylindrical stock of said cylindrically pieces thereof, a common drive means interconnecting said retention means to position said first retention means in an inoperative position to free said lowermost cylinder for discharge from said rack and simultaneously to position said retention means in operative position to hold the next succeeding piece of cylindrical stock in position in said rack and vice versa, said drive means mounted on said racks and positioned out of the path of move-



ment of said pieces of cylindrical stock from the rack and also the path of movement of a pallet along said corridors; and a portable pallet means including a skeletal frame having means to receive the prongs of a fork lift truck moveable along said corridors between facing racks and of a width to receive a single piece of said cylindrical stock positioned adjacent the working face of the storage rack for receiving the lowermost piece of cylindrical stock by gravity discharge from said rack upon operation of said retention means to free same, said pallet means including stop means positioned in a plane parallel to the longer axis of said pallet means for holding said first piece of cylindrical stock on said pallet means for subsequent transport in a direction parallel to its axis when it is discharged onto said pallet means.

4,004,702

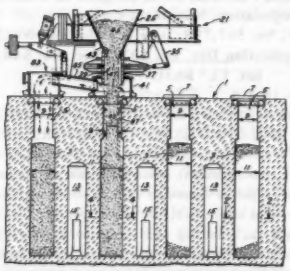
COKE OVEN LARRY CAR COAL RESTRICTING INSERT

Imre Szendroi, Allentown, Pa., assignor to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed Apr. 21, 1975, Ser. No. 570,135

Int. Cl.² C10B *31/02*

U.S. Cl. 214—35 R **6 Claims**



1. In a gravity operated hopper for charging coal into a coking chamber through a charging hole, said hopper having a collar defining a bottom discharge opening equal in minimum dimension to the minimum dimension of said charging hole, gate means for opening and closing said hopper and a drop sleeve around said collar the improvement comprising:

a. replaceable restriction means in said collar for restricting the coal flowing through said collar to a columnar mass having a width less than the interior width of said coking chamber and less than the minimum dimension of said charging hole to provide space for exhausting gases during charging of said coking chamber;

b. said restriction means is an insert comprising:

i. an outer portion in contact with the interior surface of said collar;

ii. an inner surface defining an orifice with a minimum dimension aligned in the same vertical plane as the width of the interior of said coking chamber; and

iii. means for retaining said insert in said collar.

4,004,703

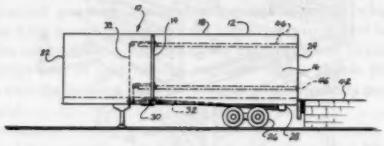
TRAILER VAN ADAPTED TO TRANSPORT COMPRESSIBLE MATERIALS

James Nelson Johnson, Jr., c/o Strick Corporation, 4525 S. Interstate No. 85, Charlotte, N.C. 28206

Filed May 12, 1975, Ser. No. 576,899

Int. Cl.² B60P *1/00*

U.S. Cl. 214—82 **7 Claims**



1. A van for transporting compressible materials comprising:

a. an enclosure having two sides, a top and a bottom and two ends, to receive said materials,

b. a bulkhead disposed within said enclosure,

c. pulling bars removably positioned against said bulkhead,

d. a cable assembly removably attached at one end to said pulling bars, to move said bulkhead, and to a forward floating block of a pulley arrangement at the other end, said pulley arrangement having a pulley ratio of from 2:1 to about 5:1,

e. a power winch located beneath said enclosure, said power winch comprising a motor and a drum having flanges at each end for collecting cable,

f. a pulley arrangement fixedly attached to said power winch having an anchor point situated between said flanges of the winch drum, the pulley arrangement being located beneath said enclosure,

g. track members fixedly attached to the side walls of said enclosure,

h. locking bars of the width of said enclosure removably engaged with said track members.

4,004,704

TAMPER-PROOF CLOSURE WITH SAFETY MEANS

Fernand Hilaire, Monte Carlo, Monaco, assignor to Captocap Limited, Vaduz, Liechtenstein

Filed May 14, 1976, Ser. No. 686,597

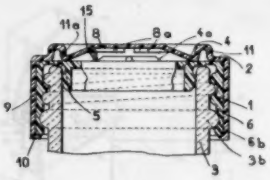
Claims priority, application France, June 20, 1975, 75.19377

Int. Cl.² B65D *55/02, 85/56;* A61J *1/00*

U.S. Cl. 215—220 **6 Claims**

1. Tamper-proof plastic closure device with safety means for containers having a screw-threaded and beaded neck, which comprises on the one hand a plug having a tapped skirt adapted to be screwed on said neck and provided on the inner

surface of its lower edge a groove adapted to receive the bead of said neck when said plug is screwed and driven home on said neck, and on the other hand a covering cap adapted to be fitted in smooth frictional engagement on the skirt of said plug and provided with a flexible top wall having a bulged central area, a circular abutment member formed on the outer surface



of said top wall around said bulged central area, the height of said circular abutment member being at least equal to the height of said bulged central area, and means for drivingly coupling said bulged central area of said top wall of said cap to the central area of said plug bottom when a pressure is exerted from the outside in the axial direction against said bulged central area of said cap.

4,004,705

CAPSULE OR SEAL CARRYING A CERTIFICATE STAMP OR THE LIKE THEREIN

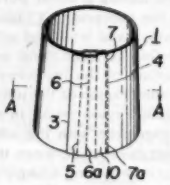
Masaaki Fujio, 3-15-8, Aoyamadai, Suita, Osaka, Japan

Filed June 12, 1975, Ser. No. 586,182

Claims priority, application Japan, July 18, 1974, 49-81699

Int. Cl.² B65D *41/54*

U.S. Cl. 215—246 **18 Claims**



1. A capsule having a certificate stamp fixed therein characterized in that ends of a heat-shrinkable film are overlapped and bonded to form a cylindrical body such that a non-bonded overlapping portion is provided between the bonded ends, and said certificate stamp is placed into said non-bonded overlapping portion, and guide lines for cutting are provided in crossed relation with the certificate stamp.

4,004,706

CYLINDRICAL RECEPTACLE OF FIBER-REINFORCED PLASTIC AND METHOD OF MANUFACTURING A RECEPTACLE

Willi Guldenfels, Neuallschwil, Switzerland, and Börge Ingmar Carlström, Hoganas, Sweden, assignors to Basler Stuckfarberei AG, Switzerland

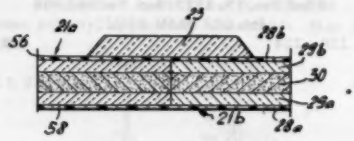
Filed Oct. 11, 1973, Ser. No. 405,286

Claims priority, application Switzerland, May 28, 1973, 7688/73

Int. Cl.² B65D *25/14*

U.S. Cl. 220—3 **11 Claims**

1. A cylindrical receptacle made of fiberglass reinforced plastic, comprising at least two plastic layers spaced from each other and containing glass fiber pieces as reinforcement, a filling layer between said two plastic layers containing a mineral granular material bonded with said plastic material, all of said layers being joined to one another by their own said plastic material, the glass fiber pieces of at least one of said



plastic layers being oriented randomly and the glass fiber pieces of at least one other plastic layer being oriented in the circumferential direction.

4,004,707

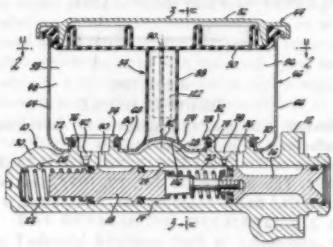
FLUID BAFFLE IN MASTER CYLINDER RESERVOIR

George E. Snyder, Phillipsburg, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 5, 1976, Ser. No. 673,709

Int. Cl.² B65D *1/24, 25/00*; B60T *11/00*

U.S. Cl. 220—22 **2 Claims**



1. In a brake fluid reservoir housing having a bottom and oppositely disposed side walls defining a fluid reservoir chamber having separate reservoir sections, the improvement comprising:

a removable baffle within said housing extending between two of said oppositely disposed side walls to divide said chamber into said separate reservoir sections; said baffle being a unitary member composed of a radially resilient generally cylindrical section positioned intermediate said two side walls and in edge engagement with and extending upwardly from said reservoir bottom within said chamber, a pair of plate sections extending in radially opposite directions outwardly from said cylindrical section and in a plane substantially perpendicular to said two side walls and passing through the axis of said cylindrical section, and a pad section on each of said plate sections in spaced relation to said cylindrical section, said pad sections being parallel to and engaging said two side walls, the planar width of said baffle between said two side walls being such, in relation to the width of said chamber between said two side walls, that an interference fit exists between said baffle and said two side walls causing a resilient compressive deformation of said center section exerting forces on said two side walls and retaining said baffle in position in said chamber, at least a portion of said baffle in edge engagement with said reservoir bottom being flexibly tapered to provide a feather edge accommodating flexible conforming engagement with said reservoir bottom.

4,004,708

FIRE-RESPONSIVE TANK TOP

Martin C. Boyd, West Chester, Pa., assignor to Philadelphia Suburban Corporation, Bryn Mawr, Pa.

Filed Dec. 19, 1975, Ser. No. 642,608
Int. Cl.² B65D *87/227*
U.S. Cl. 220—224 **4 Claims**

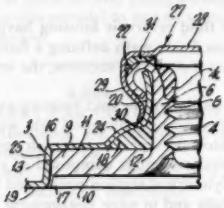
1. In a floating tank top having a deck pivotally carrying a set of weather shield plates around its periphery and extending upwardly, with bias means urging the plates outwardly so they press against the inner surface of a tank wall in which the top is mounted, the improvement accordingly to which the plates are shaped to tilt inwardly and the bias means includes a thermally responsive mechanism that tilts the plates back inwardly when they are subjected to fire.

4,004,709

DRUM CLOSURE

Vyto Simkus, Chicago, Ill., assignor to American Flange & Manufacturing Co., Inc., Linden, N.J.

Division of Ser. No. 522,637, Nov. 11, 1974, Pat. No. 3,946,894. This application Dec. 19, 1975, Ser. No. 642,340
Int. Cl.² B65D *51/20, 41/04, 7/02;* **F16L** *41/00*
U.S. Cl. 220—257 **1 Claim**



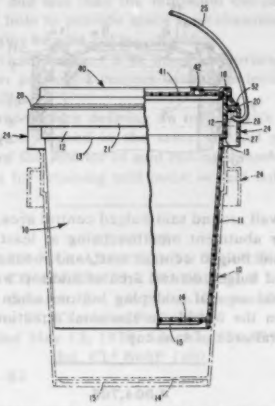
1. A container closure combination comprising a closure flange having an internally threaded upstanding cylindrical neck adapted for reception of a closure plug, a laterally extending noncircular base surrounding the lowermost end of said neck, a resilient sealing gasket tightly surrounding said flange neck and seated on said flange base, said flange being nested within a container wall section having an upstanding collar closely surrounding said flange neck, a container wall embossment at the base of said collar having a laterally extending portion overlying said flange base, a convexly contoured exterior surface formed within said laterally extending portion and a tamper-resisting seal securely affixed to said flange having a circular top wall surrounded by a depending skirt terminating in a lowermost free edge, the lower portion of said skirt being formed radially inwardly into engagement with said container wall collar with said free edge lying in close proximity to said convexly contoured embossment surface.

4,004,710

CONTAINER AND CLOSURE THEREFOR

Victor Eugene Crisci, Wellsburg, W. Va., assignor to Mammoth Plastics, Inc., Wellsburg, W. Va.

Filed Dec. 31, 1975, Ser. No. 645,891
Int. Cl.² B65D *41/16, 43/06, 43/08*
U.S. Cl. 220—306 **2 Claims**



1. A container comprising a container body and a closure both being of plastics material, the body having an annular wall defining an opening and a lip around the opening, the lip having a sealing region surrounding the opening and a radially outwardly directed shoulder spaced axially along the wall from the sealing region, the shoulder having an abutment surface facing radially outwardly and axially away from the lip, and the closure having a cover portion surrounded by a U-shaped rim, the rim comprising a radially inner axial wall, a spaced radially outer axial wall and a base interconnecting said walls which define between them an axially facing recess of the rim for insertion of the lip between the walls, the rim also including a sealing region at the junction of the inner wall and base, one sealing region being in compressively loaded and tangential engagement with the other region to provide substantially a point contact between the regions in a cross-section along the axis and along a single annular line when the lip is received within the rim, and the outer wall incorporating a radially inwardly projecting bead to coact with the shoulder to urge the lip towards the base of the rim and to urge the sealing regions into said engagement, the outer wall being resiliently flexible outwardly for snap engagement around and release from the shoulder.

4,004,711

DISPOSABLE TOWEL

Leonard E. Ravich, Boston, Mass., assignor to Gorham International Inc., Gorham, Maine

Division of Ser. No. 341,277, March 14, 1973, Pat. No. 3,889,804. This application June 16, 1975, Ser. No. 587,021
Int. Cl.² B65D *83/08;* **B65H** *1/06*
U.S. Cl. 221—63 **4 Claims**

1. In combination, a stack of pouches, one on top of another, in a container of size and shape to accommodate said stack of pouches, each of said pouches containing a towel, a solution of an oxidizing agent and a solution of a reducing agent, said solution of reducing agent being isolated from said solution of oxidizing agent, at least one of said solution of reducing agent and oxidizing agent being contained within a rupturable pod within said pouch, said container having a slit of a size and shape permitting removal of one of said pouches from said container by sliding the same through said slit, said slit having means to rupture said rupturable pod whereupon.

with removal of said pouch from said container, said pod is ruptured and said solution of oxidizing agent mixes with said

solution of reducing agent in contact with said towel and an exothermic reaction is initiated.

4,004,712

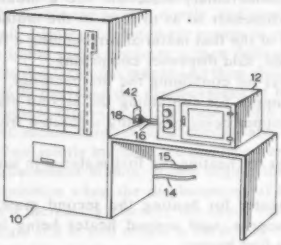
VENDING MACHINE AND MICROWAVE OVEN COMBINATION

John Francis Pond, Vineland Station, Canada, assignor to Moyer Diebel Limited, Jordan Station, Canada

Filed Oct. 21, 1975, Ser. No. 624,430

Int. Cl.² A47J *39/00*

U.S. Cl. 221—150 A **3 Claims**



1. An electrically-operated food vending machine and microwave oven combination comprising:

an inlet to the vending machine for electrical power;

an outlet from the vending machine for electrical power to operate an associated microwave oven electrically connected to the outlet and having its own cooking and timing control;

a first relay in the vending machine operable upon vending of an item by the vending machine to permit energisation of the said outlet for energisation of the oven;

a timer in the vending machine which is actuated to commence a timing period upon vending of an item by the machine and which controls the first relay to time the period during which it can permit energisation of the outlet; and

a second relay in the vending machine permitting the energisation of the said outlet and maintaining the said energisation of the microwave oven independently of the oven cooking timing control provided operation of the microwave oven is commenced under the control of its oven cooking timing control within a predetermined period set by the timer after the vending of a purchase from the machine.

4,004,713

METHOD AND APPARATUS FOR DOSING SEED

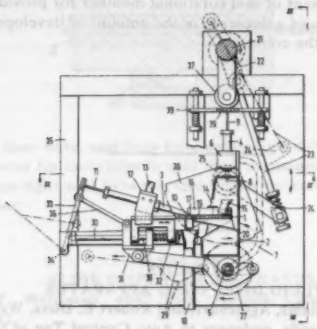
Anthony Visser, 's-Gravendeel, Netherlands, assignor to Visser Tuinbouwtechniek en Hout B.V., 's-Gravendeel, Netherlands

Filed Dec. 1, 1975, Ser. No. 636,646

Claims priority, application Netherlands, May 28, 1975, 7506282

Int. Cl.² B23Q *7/04*

U.S. Cl. 221—211 **10 Claims**



1. A method of dosed sowing of seed, characterized by periodically immersing a first hollow suction tube in a supply of seeds, retaining a limited number of seeds at the tube end by creating under-pressure inside said tube, bringing the suction tube above a substantially horizontal strip, on which the seeds retained at the tube end are dropped by removal of the vacuum, after which the strip with the seeds lying thereon is moved relative to a narrowing channel in such a manner that in the narrowest part of the channel there comes to lie each time only one seed, which seed is taken up by a second suction tube and transferred to a nutrient substrate, while the rest of the seeds lyig on the strip are returned to the supply.

4,004,714

DRY DEVELOPING MECHANISM

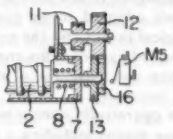
Yoshio Ito; Tadayuki Kitajima, both of Yokohama, and Yoshikuni Touyama, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 13, 1975, Ser. No. 549,768

Claims priority, application Japan, Feb. 22, 1974, 49-21687

Int. Cl.² B67D *5/22*

U.S. Cl. 222—41 **7 Claims**



1. A dry developing apparatus equipped with means for detecting the amount of developer provided therein, comprising:

a container in which the developer is contained;

a rotational member for agitating or carrying the developer, said member being provided in said container;

means for supporting said rotational member such that said member, when rotated, is displaceable axially under the force of a load resistance produced by the presence of the developer;

discharge means including an opening provided in said container to release developer as it is carried by said rotational member, thereby limiting said load resistance, and to discharge said developer to a developing station;

means for urging said rotational member to make a returning movement in the direction opposite to the direction of said displacement when said load resistance is lessened with decrease of the developer; and

means for detecting a difference in the amount of the axial displacement of said rotational member for providing an indication of a decrease in the amount of developer provided in the container.

4,004,715

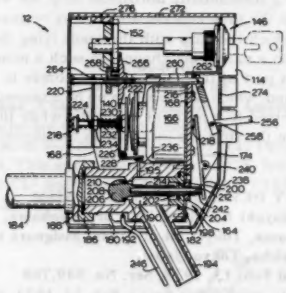
FLUID DISPENSING APPARATUS

Roger A. Williams, Agincourt, and Robert E. Dietz, Wellesley, both of Canada, assignors to Auto Control Tap of Canada Limited, Agincourt, Canada

Filed May 5, 1975, Ser. No. 574,661

Int. Cl.² B67D *5/24*

U.S. Cl. 222—30 **16 Claims**



1. Fluid dispensing apparatus for measuring and dispensing fluid from a pressurized fluid supply comprising:

a. a valve assembly including a valve and a solenoid actuator coupled thereto for opening the valve, the valve being adapted to be coupled to the pressurized fluid supply;

b. a timing circuit adapted to be connected between a source of electrical power and the solenoid actuator, the timing circuit including means for energizing the solenoid actuator to open the valve for a plurality of different predetermined intervals;

c. selector means operatively connected to the timing circuit, the selector means including a plurality of selector switches, each selector switch being adapted to select a different predetermined interval;

d. a trigger coupled to the timing circuit to activate the timing circuit and energize the solenoid actuator;

e. a removable cover enclosing the valve assembly and the timing circuit, the cover including locking means for locking the cover in position and preventing removal of the cover and thus access to the valve assembly and timing circuit; and

f. manual linkage means operatively coupled to the valve assembly for manually opening the valve; said manual linkage means including blocking means located inside the cover for preventing manual operation of the valve while the cover is in said locked position.

4,004,716

APPARATUS FOR DISPENSING CONFECTIONERY

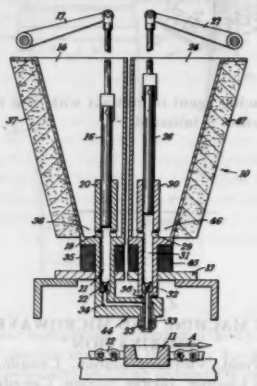
Gordon Steels, Peterborough, England, assignor to Baker Perkins Holdings Limited, England

Filed Aug. 20, 1975, Ser. No. 606,093

Claims priority, application United Kingdom, Aug. 28, 1974, 37648/74

Int. Cl.² B67D *5/46*

U.S. Cl. 222—145 **3 Claims**



1. A dispenser for effecting simultaneous deposition of first and second confectionary materials into a mould arranged beneath said dispenser so as to form in the mould a deposit having a shell of the first material surrounding a filling of the second material, said dispenser comprising:

a first hopper for containing the first material;

a second hopper for containing the second material, said second hopper being physically separated from said first hopper;

a first heater for heating the first material in said first hopper;

a second heater for heating the second material in said second hopper, said second heater being independent from said first heater;

a nozzle assembly arranged beneath said hoppers, said nozzle assembly including an inner nozzle and an annular outer nozzle surrounding said inner nozzle;

a first conduit connecting said outer nozzle to said first hopper;

a second conduit connecting said inner nozzle to said second hopper, said second conduit being separate from said first conduit;

a first plunger mounted for reciprocating movement in said first hopper for causing discharge of the first material from said first hopper through said first conduit to said outer nozzle;

a second plunger mounted for reciprocating movement in said second hopper for causing discharge of the second material from said second hopper through said second conduit to said inner nozzle;

said first plunger commencing discharge of the first material before said second plunger has commenced discharge of the second material and terminating discharge of the first material after said second plunger has terminated discharge of the second material; and

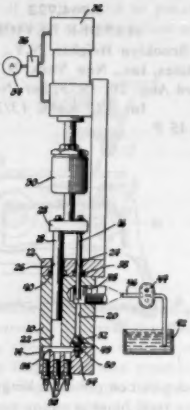
thermal insulation arranged between said first and second conduits at a location adjacent said nozzle assembly.

4,004,717

PRESSURE FED LIQUID DISPENSER

William L. Wanke, Kokomo, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 28, 1975, Ser. No. 635,916
Int. Cl.² B05B 11/28
U.S. Cl. 222—255 2 Claims



1. A liquid dispensing device comprising large and small variable displacement means, an inlet port for delivering a liquid under a charge pressure to said small variable displacement means, a dispensing nozzle, a check valve for permitting liquid flows from said small variable displacement means to said nozzle at pressures above said charge pressure and preventing reverse flow, said large variable displacement means continuously connected to said nozzle, and means for operating said small variable displacement means to open said inlet port so that liquid under pressure is then delivered to fill said small variable displacement means and then close off said inlet port and jointly decrease the displacement of both said variable displacement means to force liquid in said small variable displacement means through said check valve and out said nozzle and then jointly increase the displacement of both said variable displacement means, means urging the check valve into closed position when the displacement of both displacement means is increasing whereby the check valve then closes while the liquid still in said nozzle is suctioned by the expanding large variable displacement means to thereby prevent dripping from the nozzle and also break any string of the liquid dispensed from the nozzle.

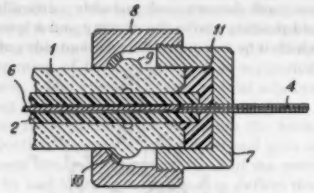
4,004,718

SYRINGES

Frank Wesley, Sidcup, England, assignor to Societe d'Assistance Technique pour Produits Nestle S.A., Lausanne, Switzerland

Continuation of Ser. No. 182,075, Sept. 20, 1971. This application May 23, 1974, Ser. No. 472,838
Int. Cl.² B67D 1/08
U.S. Cl. 222—386 7 Claims

1. A syringe which comprises an elongated transparent barrel, an elongated plunger disposed in said barrel and slidable along a first length thereof, an inner liner in said barrel disposed along the remaining length of said barrel, said liner being comprised of a resilient plastics material and extending in an encircling course enclosing a space defining a bore of normally substantially constant cross-sectional dimension, said bore providing a reservoir for holding a fluid, and a piston connected to said plunger extending coaxially therewith and within the liner bore for sliding travel in said bore when said plunger is slid in said barrel first section, said first length of said barrel being graduated to indicate the volume of fluid in the syringe, the cross-sectional area of at least a tip end portion of said piston being greater than the cross-sectional area



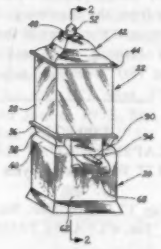
of said liner bore, said liner bore enlargingly deforming when said piston tip end slides in said liner to maintain a substantially gas tight seal between said piston tip end portion and said liner.

4,004,719

SLIDE DISPENSER APPARATUS

Lane T. Weitzman, 4647 Park Mirasol, Calabasas, Calif. 91302

Filed Aug. 14, 1975, Ser. No. 604,892
Int. Cl.² G01F 11/10
U.S. Cl. 222—366 8 Claims



5. A dispensing device comprising: (a) a chamber having a bottom surface, said bottom surface having at least one hole therein; (b) a slide member, said slide member slidable in relationship to said bottom surface in a plane substantially parallel to the plane of said bottom surface between a first position and a second position; (c) said slide member having at least one opening therein, said opening aligning with at least a part of said hole in said bottom surface when in said first position whereby material contained in said chamber may fall into said opening and said opening not located below said bottom surface of said chamber when in said second position; (d) a spoon shaped member having an upwardly directed cavity therein and a handle means attached thereto, the cavity of said spoon shaped member removably fitting within said opening in said sliding member, said handle positioned whereby said handle is not below said bottom surface when said sliding member is in said second position.

4,004,720

IRONING MACHINE FOR IRONING COLLARS AND LAPELS OF CLOTHING GOODS

Giovanni Cartabbia, Via Predore 10, 24067 Sarnico, Italy

Filed Dec. 19, 1975, Ser. No. 642,530
Claims priority, application Italy, Dec. 23, 1974, 30965/74
Int. Cl.² D06C 15/00
U.S. Cl. 223—57 7 Claims

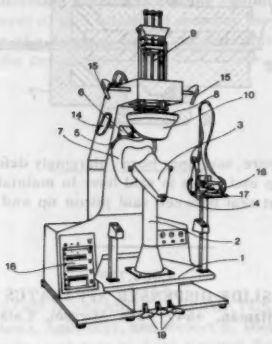
1. A machine, for the ironing of the collar and lapels of articles of clothing, comprising:

i. A machine frame

ii. a dummy mounted rotatably on said machine frame for rotation about a vertical axis

iii. means on said frame and connected to said dummy for rotating said dummy through 180°

iv. a first presser mould mounted on said machine frame above said dummy and movable vertically between a raised position above the dummy and a lowered position in which it bears against the rear and sides of the collar of



an article of clothing on the dummy, when said dummy is in a first position of rotation,

v. a second presser mould mounted on said machine frame laterally of said dummy and mounted between a first position remote from the dummy and a second position in which it bears against the front of the collar and the lapels of the article of clothing, when said dummy is in a second position rotated 180° from said position of rotation.

4,004,721

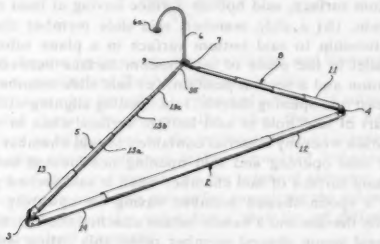
COLLAPSIBLE COAT HANGER

Jackson E. Ross, 4127 W. Cheery Lynn Road, Phoenix, Ariz. 85019

Filed May 17, 1976, Ser. No. 687,032

Int. Cl.² A47J *51/10*

U.S. Cl. 223—89 **10 Claims**



1. A collapsible coat hanger, said coat hanger comprising in combination:

a. a base member having a plurality of telescoping sections;

b. a first arm having a plurality of telescoping sections;

c. a first swivel for pivotally interconnecting one end of said base member with one end of said first arm;

d. means for suspending said coat hanger from a support, said suspending means being attached to another end of said first arm;

e. a second arm having a plurality of telescoping sections;

f. a second swivel for pivotally interconnecting another end of said base member with one end of said second arm;

g. hook means for interlocking another end of said second arm with said other end of said first arm to form a triangle of said base member and said first and second arms; and

h. a housing forming a part of said base member for receiving the collapsed telescoping sections of said base member, the collapsed telescoping sections of said first and second arms and said first and second swivels;

whereby, said coat hanger is telescopingly collapsible into said housing of said base member.

4,004,722

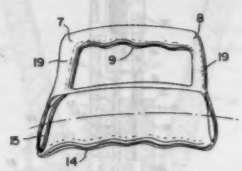
HANDLE DEVICE

Lynn Olivier, Brooklyn Heights, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Aug. 20, 1975, Ser. No. 606,204

Int. Cl.² A45C *13/26*

U.S. Cl. 224—45 P **1 Claim**



1. A handle device comprising a longitudinal hollow tubular section having a rigid hand grasping portion, said hand grasping portion having finger gripping undulations formed in the surface thereof, said hand grasping portion parallel to said longitudinal hollow tubular section and spaced radially outwardly therefrom, said hand grasping portion joined to said longitudinal hollow tubular section by two rigid joining members formed at the free ends of said longitudinal hollow tubular section, said joining members substantially perpendicular to the longitudinal axis of said hollow tubular section and said hand grasping portion forming a void whose length is less than the length of said longitudinal hollow tubular section, a continuous slit passing through the wall of said longitudinal hollow tubular section, said slit parallel to the longitudinal axis of said hollow tubular section, said slit extending the entire length of said longitudinal hollow tubular section, said joining members immediately adjacent first edge of said slit, second edge of said slit substantially thinner than said first edge, finger accommodating undulations on the outer surface of said longitudinal hollow tubular section.

4,004,723

APPARATUS FOR REMOVAL OF GLASS SHEET FLASH

Nikolai Pavlovich Kabanov, Naberezhnaya Shevchenko, 3, korpus 3, kv. 50; Vitaly Sergeevich Schukin, Leninsky prospekt, 72, kv. 500, both of Moscow; Jury Alexeevich Knyazev, ulitsa Shkolnaya, 1, kv. 16, Bor Gorkovskoi oblasti; Sergei Fedorovich Makhalov, ulitsa Shkolnaya, 5, kv. 10, Bor Gorkovskoi oblasti; Mikhail Ivanovich Popov, ulitsa Shkolnaya, 5, kv. 15, Bor Gorkovskoi oblasti; Dmitry Nikolaevich Savonichev, ulitsa Shkolnaya, 4, kv. 8, Bor Gorkovskoi oblasti; Dmitry Nikolaevich Shepelev, ulitsa Mayakovskogo, 1, kv. 3, Bor Gorkovskoi oblasti; Vladimir Nikolaevich Suvorov, ulitsa Shkolnaya, 2, kv. 6, Bor Gorkovskoi oblasti, and Vladimir Pavlovich Chalov, ulitsa Mira, 3, kv. 2, Bor Gorkovskoi oblasti, all of U.S.S.R.

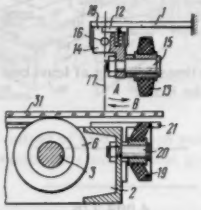
Filed Feb. 5, 1975, Ser. No. 547,402

Int. Cl.² C03B *33/02*

U.S. Cl. 225—103 **6 Claims**

1. In an apparatus for removing flash from a marginal edge of a glass sheet scored to define a shaped portion to be cut from the glass sheet and of the type having means for supporting a major portion of the glass sheet; and means for applying a force to the flash along the marginal edge of the glass sheet to separate the flash portion from the shaped portion to be cut from the sheet; the improvement which comprises: said means

for supporting a major portion of the glass sheet including a portion partially underlying the flash portion of the glass sheet; and said means for applying a force comprising the portion of said means for supporting which underlies the flash portion of the glass sheet, at least one resilient roller engagable with the portion of the flash portion which overlies said means for supporting to bear against the flash portion, and means mounting said at least one resilient roller to freely rotate about an axis of rotation and to pivot about an axis generally perpendicular to its axis of rotation and outwardly of



the glass sheet while bearing against the flash portion thereby to apply a force effective to separate the flash portion outwardly from the glass sheet; and further comprising means operable for relatively displacing said means for supporting and said at least one resilient roller to bring said at least one resilient roller into engagement with the flash portion to effect separation of the same from the shaped portion to be cut from the glass sheet and for displacing said at least one resilient roller to disengage from the flash portion after separation of the flash has been effected.

4,004,724

APPARATUS FOR REMOVING EXPOSED FILMS AND BACKING STRIPS FROM CONTAINERS

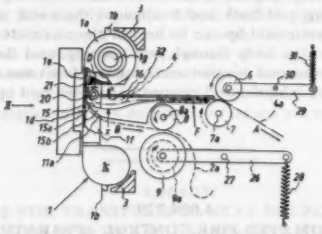
Helmut Zangenfeind, Puchheim, and Gerhard Küstner, Munich, both of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Jan. 26, 1976, Ser. No. 652,107

Claims priority, application Germany, Jan. 29, 1975, 2503577

Int. Cl.² G03B *1/56*

U.S. Cl. 226—91 **16 Claims**



1. Apparatus for removing convoluted films and backing strips from containers of the type wherein a casing of the container is provided with registering first and second openings, at least the leader of the backing strip is located between the openings, the casing has a wall which is formed with one of said openings and the leader of the backing strip is disposed between said wall and the other of said openings, comprising a pusher movable forwardly and backwards along a predetermined path; locating means arranged to support the casing of a container in such position that the openings of the casing are located in said path whereby said pusher passes, during the forward movement thereof, first through said one opening and thereupon through said other opening of the casing which is supported by said locating means and expels the leader of the backing strip through said other opening; first advancing means located behind said other opening of the casing which is supported by said locating means and arranged to engage the expelled leader of the backing strip and to advance the thus engaged backing strip lengthwise to thereby draw the film from the casing through the intermediary of the backing strip; film advancing means located behind and spaced apart from said other opening of the casing which is supported by said locating means; a film channel having an inlet adjacent to said other opening and an outlet adjacent to said film advancing means; means for separating the film from the backing strip including a portion disposed at one side of said inlet and being closely adjacent but spaced from said wall of the casing which is supported by said locating means so as to deflect the oncoming leader of the film when said last mentioned leader reaches said portion of said separating means so that the leader of the film enters said inlet and moves into the range of said film advancing means in response to transport of the backing strip by said first advancing means, the maximum width of said channel being such that the leader of the film therein is held against curling or folding during movement toward said film advancing means; and an auxiliary deflector located at the other side of said inlet opposite said separating means to prevent curling of the leader of the film before such leader reaches said separating means during withdrawal of the backing strip from the casing which is supported by said locating means.

4,004,725

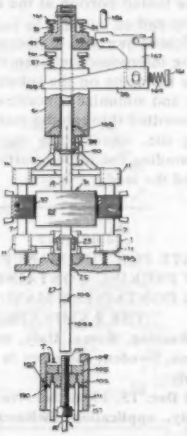
APPARATUS FOR ASSEMBLING COMPONENTS OF A DYNAMOELECTRIC MACHINE

Jesse A. Stoner, DeKalb, Ill., assignor to General Electric Company, Fort Wayne, Ind.

Continuation of Ser. No. 401,177, Sept. 27, 1973, abandoned. This application Jan. 6, 1975, Ser. No. 539,038

Int. Cl.² B23K *37/06*

U.S. Cl. 228—49 **26 Claims**



1. Apparatus for assembling a pair of opposite end frames of a dynamoelectric machine to a structural component thereof positioned for assembly within receiving means therefor in the end frames, respectively, said apparatus comprising means for moving at least one of the structural component and the end frames to the assembly position and for supporting the structural component and the end frames in the assembly position, means for introducing molten metal into the receiving means to form rigid ties between the end frames and the structural component when supported in the assembly position thereof by said moving and supporting means, and means for inverting

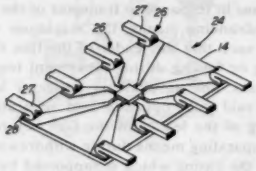
said moving and supporting means with the structural component and end frames in the assembly position therein so as to dispose the receiving means of one of the end frames in a position to receive the molten metal from said introducing means subsequent to the solidification of the molten metal introduced into the receiving means of the other of the end frames.

4,004,726

BONDING OF LEADS

Thomas S. Ellington, IV, Bethlehem, Pa., assignor to Western Electric Company, Inc., New York, N.Y.

Filed Dec. 23, 1974, Ser. No. 535,600
Int. Cl.² H05K *1/10, 3/32*
U.S. Cl. 228—173 **3 Claims**



1. In a method of bonding one end of a lead to a metallized bond site on a substrate, an improvement to minimize the occurrence of a failure resulting in separation of such lead from the bond site of the substrate at an interface between the lead and the metallization of the bond site in response to a force exerted on the lead in a direction perpendicular to the plane of the bond, the improvement comprising:

providing the lead with a folded end portion shorter than a main member of the lead;

positioning the end of the lead having the folded portion in contact with the respective bond site on the substrate, such that the folded portion at the end of the lead faces the bond site; and

bonding the folded portion to the substrate, the folded portion being interposed between the main body of the lead and the bond site on the substrate being positioned to distribute and minimize concentrations of any bending stresses transmitted through the main body of the lead to the bonding site, wherein the step of bonding further comprises bonding the folded portion of the lead to the main body of the lead.

4,004,727

LAMINATE FOR THE MANUFACTURE OF LIQUID-TIGHT PACKING CONTAINERS AND A BLANK FOR PACKING CONTAINERS MANUFACTURED FROM THE LAMINATE

Ruben Anders Rausing, Rome, Italy, and Ingemar Wilhelm Ohlsson, Malmo, Sweden, assignors to Anders Ruben Rausing, Rome, Italy

Filed Dec. 15, 1975, Ser. No. 640,943
Claims priority, application Switzerland, Jan. 6, 1975, 35/75
Int. Cl.² B65D *3/00*
U.S. Cl. 229—4.5 **8 Claims**

1. A blank of carton-forming material for manufacturing containers said blank comprising a laminate having two layers of polystyrene foam in which the cellular structure has lenticular shaped cells created by stretching the polystyrene foam when being initially extruded to form the layers and an intermediate layer disposed between and adhered to said polystyrene foam layers, said intermediate layer being dimensionally stable and provided with at least one cut-out portion adjacent at least one edge of the blank, whereby when the blank is erected to form a container the polystyrene foam layers may be heated in the area of the at least one cut-out portion in the intermediate layer so as to shrink the foam layers to provide

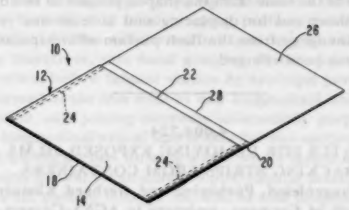
inwardly folded portions forming at least one part of the container made from the blank.

4,004,728

MACHINE FILLABLE ENVELOPE

James Ryan, and Robert W. Vandenberg, both of Fremont, Mich., assignors to Gerber Products Company, Fremont, Mich.

Filed Apr. 18, 1974, Ser. No. 461,811
Int. Cl.² B65D *27/20*
U.S. Cl. 229—76 **8 Claims**



1. An envelope for use in the machine insertion of material therein comprising: a flat, sheet-like body having a front, a back, and an opening adjacent to one end margin of said front to permit materials to be inserted into the body and disposed between said front and said back, the back having a lip projecting outwardly from the opening, there being an adhesive-free closure flap hingedly connected to the outer margin of the lip underlying said back and contiguous therewith in a first position wherein said lip can be held in place as materials are directed into the body through said opening, said flap being movable to a second position overlying said front and contiguous therewith wherein said closure flap closes said opening.

4,004,729

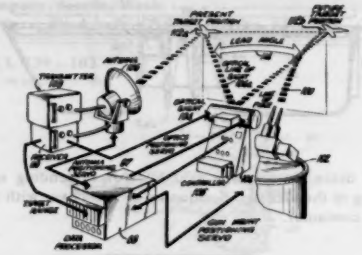
AUTOMATED FIRE CONTROL APPARATUS

Harris C. Rawicz, Bridgewater; William J. Bigley, Scotch Plains, both of N.J.; Gene L. Cangiani, Bronx, N.Y., and Rene C. Yohannan, Sterling, N.J., assignors to Lockheed Electronics Co., Inc., Plainfield, N.J.

Filed Nov. 7, 1975, Ser. No. 629,976
Int. Cl.² G06F *15/58;* **F41G** *3/08*
U.S. Cl. 235—61.5 S **22 Claims**

1. In combination in a fire control system for controlling the firing trajectory of a weapon, an optical sight including optical line of sight axis determining means and means for variably adjusting said optical axis determining means, gunner actuated controller means, said optical axis adjusting means being connected and responsive to the output signal generated by said gunner actuated control means, weapon position varying

means, means for signalling the positional status of said weapon positioning means, and means connected to and responsive to the output of said weapon positional status signalling means for controlling said optical axis adjusting means.

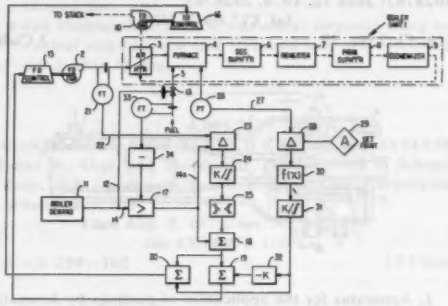


4,004,730

FURNACE DRAFT CONTROL FOR A STEAM GENERATOR

Robert R. Walker, Euclid, Ohio, assignor to Bailey Meter Company, Wickliffe, Ohio

Filed Sept. 22, 1975, Ser. No. 615,329
Int. Cl.² F23N *3/08*
U.S. Cl. 236—14 **8 Claims**



1. A furnace draft control for a steam generator having a furnace, fuel supply means, forced draft supply means, and induced draft supply means, in combination, means generating a first control signal proportional to furnace pressure and means under the control of said signal increasing the forced draft and simultaneously decreasing the induced draft in functional relationship to a decrease in furnace pressure and vice versa.

4,004,731

DEVICE FOR TRANSFERRING HEAT ENERGY FROM A FIREPLACE TO A FLUID HEATING SYSTEM

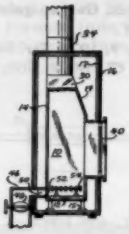
Joseph T. Zung, P.O. Box 491, Rolla, Mo. 65401

Filed Sept. 5, 1975, Ser. No. 610,541
Int. Cl.² F24B *7/00*
U.S. Cl. 237—51 **5 Claims**

1. In a circulating-air building temperature control system including means defining a pumped air circulation conduit for distributing controlled temperature air throughout the building and collecting return air, plus air heating means and cooling means for temperture control of the building positioned within said air circulation conduit, the improvement comprising:

an auxiliary heating unit positioned within said air circulation conduit, comprising a fireplace for burning solid fuel, defined by fireplace chamber walls and grate means for holding the fuel, said air circulation conduit being positioned about the exterior of said fireplace chamber walls, said fluid circulation conduit being sealed from said fireplace chamber;

chimney means communicating with said fireplace chamber, said chimney means being positioned in off-center relationship to said fireplace chamber; and a heat-conductive wall sealing the upper end of said fireplace chamber about the chimney, said conductive wall being positioned to slope upwardly from the end of the fireplace chamber remote from said chimney means to said chimney means, said sloped wall overlying a major portion of said fireplace chamber; solid, transparent, openable and closable door means to separate, in closed position, said fireplace chamber from the building interior, whereby a fire in said fireplace chamber may be viewed without the removal of large amounts of air from the building interior through the chimney means; and independent air supply means to provide air from the building exterior to the fireplace chamber, to facilitate combustion therein.

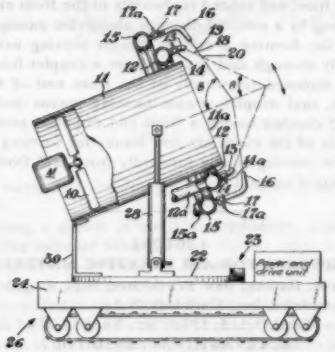


4,004,732

SNOW MAKING METHOD

Alden W. Hanson, 1605 St. Andrews Drive West, Midland, Mich. 48640

Continuation-in-part of Ser. No. 497,839, Aug. 16, 1974, abandoned. This application Oct. 31, 1975, Ser. No. 627,890
Int. Cl.² F25C *3/04*
U.S. Cl. 239—2 S **5 Claims**



1. In a method for producing artificial snow in a snow making machine which operates by introducing a water spray into a fan-generated large volume unidirectional mechanical movement of air at substantially atmospheric pressure and at a temperature of below 32° F., thereby to effect at least partial crystallization of the droplets of water in the spray, the improvement which comprises regularly redirecting the position and direction of the resultant snow particle laden air stream in a predetermined moving pattern such that the snow particles in the air stream are directed towards a portion of the atmo-

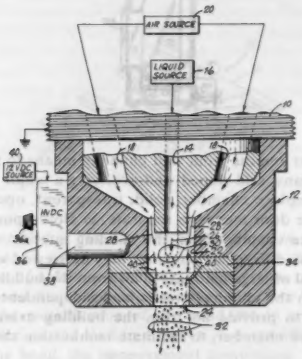
sphere different from that contacted by immediately previously generated snow particles and are deposited onto a different area than such immediately previously generated particles and the cross-sectional area covered by the regularly directed moving pattern of said snow particles is at least three times greater than that covered by the pattern of particles generated by the discharge end of said snow making machine.

4,004,733

ELECTROSTATIC SPRAY NOZZLE SYSTEM

S. Edward Law, Athens, Ga., assignor to Research Corporation, New York, N.Y.

Filed July 9, 1975, Ser. No. 594,266
Int. Cl.² B05B *5/02, 7/06*
U.S. Cl. 239—3 **14 Claims**



1. An electrostatic spray nozzle comprising:

a housing made of an electrically insulating material and having a front end and a back end axially spaced from each other and means defining a hollow passage extending axially from the back end forwardly toward the front end of the housing;

an annular electrode made of an electrically conductive material and disposed within the housing, coaxially with and surrounding the hollow passage, said electrode having a front end spaced rearwardly of the front end of the housing by a selected distance along said passage; and

means for forming a droplet stream moving axially forwardly through said passage from a droplet forming region disposed rearwardly of the front end of the electrode, said droplet stream forming means including a liquid conduit having a front end disposed axially rearwardly of the electrode and means for forming a liquid stream moving axially forwardly from said front end of the liquid conduit.

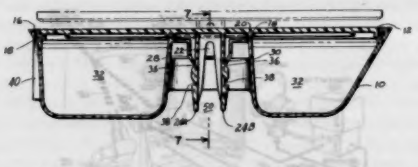
4,004,734

DISPENSER FOR AIR TREATING MATERIAL

Frederick B. Hadtke, New Providence, N.J., assignor to Airwick Industries, Inc., Carlstadt, N.J.

Filed Oct. 3, 1975, Ser. No. 619,274
Int. Cl.² A61L *9/00;* **B65D** *21/02*
U.S. Cl. 239—58 **11 Claims**

1. A dispenser for solid volatile materials comprising a container for said volatile material having a socket therein, said socket having two opposing walls terminating in inwardly extending sections; and a cover for said container having at least two resilient prongs extending therefrom insertable and engagingly receivable in the socket of said container, the outer surface of each of said prongs having a first detent means and at least one second detent means positioned at a greater distance from said cover than said first detent means, the positive engagement of said first detent means and said inwardly extending sections effecting the closure of the cover on said container and the positive engagement of said at least one



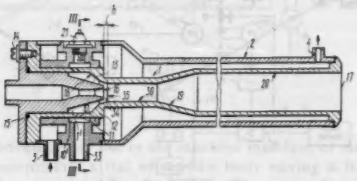
second detent means and said inwardly extending sections resulting in the elevated positioning of said cover with respect to said container.

4,004,735

APPARATUS FOR DETONATING APPLICATION OF COATINGS

Anatoly Ivanovich Zverev, ulitsa Bratislavskaya, 26, kv. 22, Kiev; Alexandr Sergeevich Bondarenko, ulitsa Nizhegorodskaya, 26, kv. 40, Moscow; Mikhail Antonovich Pudzinsky, ulitsa Sverdlova, 13, kv. 21, Kiev; Vadim Mikhailovich Sopryazhinsky, ulitsa Bogdanovskaya, 5a, kv. 32, Kiev, and Nikolai Alexeevich Yakshin, ulitsa Kartvilishvili, 3v, kv. 51, Kiev, all of U.S.S.R.

Filed June 3, 1975, Ser. No. 583,246
Claims priority, application U.S.S.R., June 12, 1974, 2028702; June 12, 1974, 2028703
Int. Cl.² B05B *1/24*
U.S. Cl. 239—79 **3 Claims**



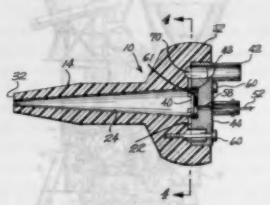
1. Apparatus for the application of coatings by detonation comprising; an explosion chamber in the form of a tube closed at one end; a batcher for powdered coating with a discharge pipe; a jet nozzle secured to the end of said discharge pipe and communicating the latter with the space of said explosion chamber; a circular precombustion chamber surrounding said explosion chamber near its closed end and communicating with its space through holes in the walls of said explosion chamber; a mixing chamber which prepares the explosive mixture; a safety pipe provided for communicating said mixing chamber with said precombustion chamber for delivering the explosive mixture from said mixing chamber through said precombustion chamber and said holes in the walls of said explosion chamber into its space; said jet nozzle installed in the face of the closed end of said explosion chamber so that its outlet section is located ahead of said holes in the walls of said explosion chamber relative to its open end, and the discharge of the powdered material from said nozzle into the space of said explosion chamber is accompanied by drawing the powdered material from said nozzle into the space of said explosion chamber by the vacuum created by the explosion and its intensive mixing with the explosive mixture; at least one spark plug for igniting the explosive mixture installed on the external wall of the precombustion chamber at a point located opposite the spaces between the holes in the walls of the explosion chamber so that a detonating wave originated in said explosion chamber throws the powdered coating through the open end of said explosion chamber onto the surface of the article located in front of it.

4,004,736

ULTRASONIC WATER JET

Loyd William George, Renton, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed June 1, 1976, Ser. No. 691,960
Int. Cl.² B05B 17/06
U.S. Cl. 239—102 6 Claims



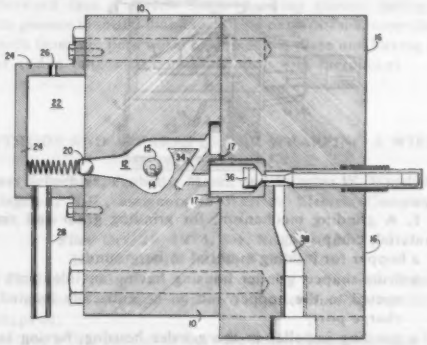
1. An ultrasonic water jet comprising in combination:
a first non electrically conductive housing section having an interior exponentially shaped duct;
a second electrically conductive housing section having a circular slot;
a non electrically conductive O-ring disposed in said circular slot;
a plurality of equiangularly displaced slots in said first non electrically conductive housing section circumferentially disposed about the central axis of said exponentially shaped duct; and,
a disk shaped piezo electric transducer disposed along said central axis between said slots and said non electrically conductive O-ring.

4,004,737

CONTINUOUS HIGH VELOCITY FLUID JET SYSTEM

Walter W. Aker, and Theodore T. Naydan, both of Schenectady, N.Y., assignors to Environment/One Corporation, Schenectady, N.Y.

Filed Aug. 5, 1975, Ser. No. 602,095
Int. Cl.² B05B 17/04
U.S. Cl. 239—102 13 Claims



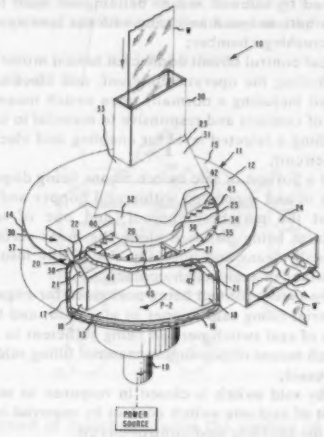
1. An apparatus for producing a continuous high velocity fluid jet stream comprising a high pressure accumulator to receive pulses of fluid under pressure, fluid pressure intensifying means for delivering fluid under pressure into said accumulator, said fluid pressure intensifying means comprising a high pressure chamber for receiving fluid, electrical arc discharge means disposed in said chamber, fluid inlet means to supply fluid from a fluid source into said chamber, said fluid inlet means comprising a zig zag passageway having a multiplicity of turns for increasing frictional resistance to the flow of high pressure fluid, fluid inlet check valve means interconnected between the fluid source and the zig zag passageway for preventing the back flow of pressurized fluid into the fluid source, a high pressure fluid outlet passageway leading from said chamber into said accumulator, fluid outlet check valve means in said outlet passageway to permit fluid under pressure to flow from said chamber into said accumulator and to prevent backflow of fluid under pressure from said accumulator back into said chamber, electric supply means for supplying high voltage electric energy to said electric arc discharge means to produce a high energy electric discharge arc through the fluid in said chamber to raise its pressure and deliver a pulse of fluid under pressure from the chamber into said accumulator, and outlet means from said accumulator for delivery of a continuous high velocity fluid jet stream.

4,004,738

METHOD OF AND APPARATUS FOR SHREDDING A WEB OF PLASTIC FILM

William E. Hawkins, Circleville, Ohio, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sept. 19, 1975, Ser. No. 615,186
Int. Cl.² B02C 18/12
U.S. Cl. 241—29 7 Claims

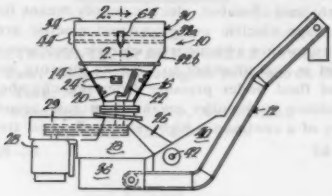


1. A method of shredding a web of material including the steps of:
providing a stream of air in a shredder by rotating a fan having impeller blades;
moving the web by means of the stream of air in a first path;
shredding at least part of the web to form shredded and unshredded portions thereof as the web moves in the first path by means of a web first shredder means, such web as moved in the first path being transverse to the direction of rotation of the blades and to the first shredding means;
immediately moving the shredded portion of the web out of the shredder by means of the stream of air;
pulling the unshredded portion of the web from the first path and into a second path;
shredding the unshredded portion of the web as it moves in the second path, such unshredded web as moved in the second path being transverse to the direction of rotation of the blades and to the second shredding means; and
thereafter moving the thus shredded web out of the shredder by means of the stream of air.

4,004,739
CRUSHER AND MATERIAL SENSOR

Gerhardt H. Cramer, Portage, Mich., assignor to Prab Conveyors, Inc., Kalamazoo, Mich.

Filed Oct. 24, 1975, Ser. No. 625,495
Int. Cl.² B02C 25/00
U.S. Cl. 241—34 8 Claims



1. Apparatus for crushing swarf and like materials comprising:

a crushing chamber for the material to be crushed, said crushing chamber having a loading opening to receive the material to be crushed and having means for discharging crushed material;

crushing means disposed within said crushing chamber;

motor means operable for driving said crushing means to effect crushing of material within said crushing chamber;

a supply hopper for receiving and storing material to be crushed, disposed above said crushing chamber and formed by sidewall means defining an open top and an open bottom communicating with the loading opening of the crushing chamber;

electrical control circuit connected to said motor means for controlling the operation thereof; said electrical control circuit including a normally open switch means having a pair of contacts and responsive to material in said hopper reaching a selected level for enabling said electrical control circuit;

at least a portion of said switch means being disposed internally of and supported within said hopper and extending about the periphery thereof, and one of said switch contacts being disposed along the inner surface of said sidewall means and normally electrically insulated from the other of said switch contacts;

said one switch contact being positioned for engagement by material filling said hopper as aforesaid, and the surface area of said switch portion being sufficient to insure said switch means responding to material filling said hopper as aforesaid;

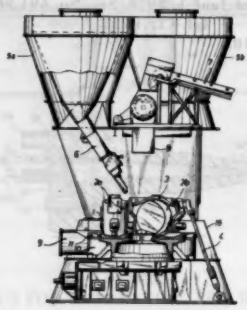
whereby said switch is closed in response to said engagement of said one switch contact by material in said hopper for enabling said control circuit.

4,004,740
ROLLER CRUSHING MILL

Otto Heinemann, Ennigerloh; Heinz-Herbert Schmits, Rheda-Wiedenbruck, and Heinz Dieter Baldus, Ahlen, all of Germany, assignors to Polysius AG, Neubeckum, Germany

Filed Dec. 31, 1975, Ser. No. 645,800
Claims priority, application Germany, Jan. 28, 1975, 7502452[U]
Int. Cl.² B02C 15/00
U.S. Cl. 241—52 7 Claims

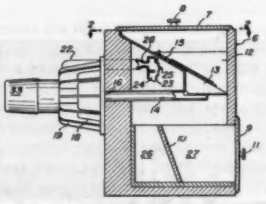
1. In a crushing mill having a housing, a grinding plate within said housing rotatable about a substantially vertical axis, a plurality of roller means at peripherally spaced intervals bearing on said grinding plate and rotatable about a substantially horizontal axis, sifting means supported above said grinding plate in communication with said housing for receiving and sifting crushed material, and air conduit means below said grinding plate for supplying sifting air, the improvement comprising first nozzle means between said conduit means and said housing adjacent the periphery of said plate and positioned in the vicinity of each of said roller means for establishing a substantially upwardly directed first airstream, and second nozzle means between said conduit means and said housing adjacent the periphery of said plate and positioned between adjacent ones of said roller means for establishing second airstreams directed inwardly of said plate.



4,004,741
GRINDING MECHANISM

Eldon E. Perry, 141 North, 600 East, Kaysville, Utah 84037

Filed Oct. 28, 1975, Ser. No. 626,064
Int. Cl.² B02C 23/28
U.S. Cl. 241—55 15 Claims



1. A grinding mechanism, for grinding grain and similar material, comprising:

a hopper for holding material to be ground;

a drum-shaped grinder housing having an inlet port connected to the hopper and an eccentrically located discharge port;

a grinding impeller in the grinder housing, having radial, paddle-type blades fixed to a shaft that extends through at least one end of the housing;

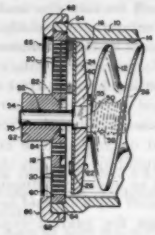
a dam on the inside surface of the grinder housing adjacent and partially surrounding the discharge port on the downstream side thereof relative to the motion of the impeller blades, so that the dam will intercept air from the vortex created by the impeller to aid in forcing finely ground material through the discharge port and maintain the discharge port in an unclogged condition; and

a motor attached to the grinder housing and to the impeller shaft for rotating the impeller.

4,004,742
ROTARY MEAT GRINDER WITH BONE-COLLECTING FACILITIES

Charles W. Hess, Schiller Park, Ill., assignor to Speco, Inc., Schiller Park, Ill.

Filed Feb. 17, 1976, Ser. No. 658,365
Int. Cl.² A47J 43/07
U.S. Cl. 241—82.5 3 Claims



1. A perforated grinder plate adapted for use in a meat grinder of the type that comprises a horizontally elongated tubular casing having one end thereof forming a meat inlet and its other end forming a ground meat outlet and defining a meat channel between the inlet and the outlet, a meat-impelling worm extending lengthwise of and mounted for rotation in the channel, provided at its rear end with a cylindrical pilot shaft, and effective upon rotation thereof to impell meat rearwardly through the channel from the inlet to the outlet, and a knife assembly mounted on the rear end region of the worm for rotation in unison with the worm and having a series of generally radially extending blades, said perforated meat grinder plate being adapted to extend vertically across said other end of the casing with its forward face in shearing relation with the blades of the knife assembly, embodying in its central portion an axial journal-forming bore for supporting rotatably said pilot shaft, and having formed in its forward face a large-sized counterbore which is disposed in coaxial relation with the bore and defines with the adjacent portion of the pilot shaft a substantially large annular bone-collecting pocket which except for its front end is closed in order that any bone particles which collect therein do not pass through the plate, said perforated grinder plate also having formed in its forward face a narrow bone-receiving groove having a width greater than the diameter of the perforations, extending inwards from the peripheral region of the plate and having its inner end in tangential communication with the pocket.

4,004,743
METHODS AND APPARATUS FOR WRAPPING A WIRE ON A TERMINAL

Robert Schechter, Peabody, Mass., and Douglas W. Winslade, Kingston, N.H., assignors to Western Electric Company, Inc., New York, N.Y.

Filed Oct. 29, 1974, Ser. No. 518,537
Int. Cl.² H01B 13/00; B21F 15/00
U.S. Cl. 242—7.03 17 Claims

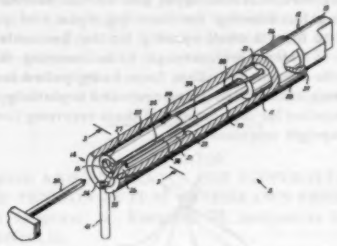
1. A method for wrapping a wire on a terminal, comprising the steps of:

inserting a first portion of the wire into a channel formed by a longitudinal ridge on the periphery of a cylindrical drive member and one edge of a longitudinal opening in a hollow cylinder mounted circumferential to the drive member and into which opening the ridge projects;

releasably clamping the first wire portion between the longitudinal ridge and the edge of the longitudinal opening in the hollow cylinder upon rotation of the cylindrical drive member;

retaining a second portion of the wire adjacent the first wire portion against movement;

further rotating the drive member relative to the second wire portion to transmit rotational motion through the releasably clamped first wire portion to the hollow cylinder causing the releasably clamped first wire portion to be withdrawn from the channel, under tension, and wrapped about the terminal; and

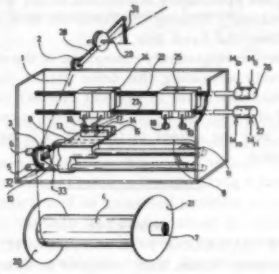


biasing the hollow cylinder to a postion wherein the longitudinal ridge contacts another edge of the longitudinal opening in the hollow cylinder upon withdrawal of the releasably clamped first wire portion from the channel.

4,004,744
WINDING APPARATUS

Luc Hoorelbeke, Kortrijk, Belgium, assignor to N.V. Bekaert S.A., Zwevegem, Belgium

Filed Mar. 21, 1975, Ser. No. 560,619
Claims priority, application United Kingdom, Apr. 2, 1974, 14582/74
Int. Cl.² B65H 54/28
U.S. Cl. 242—25 R 15 Claims



1. A method of detecting, during the winding of a thread onto a flanged spool by a winding apparatus having a thread guide which traverses the thread back and forth lengthwise of the spool, irregularities of the surface of the wound thread in two zones each adjacent to a respective one of the flanges of the spool, the method comprising sensing changes of the linear speed of the thread being supplied to the spool when the thread guide guides the thread into one of said zones, said changes being sensed between the spool and an upstream located buffer-accumulator.

4,004,745
YARN DISPENSING APPARATUS

Jacqueline L. Booth, Box 21, Bayview, Idaho 83803

Filed June 18, 1975, Ser. No. 587,913
Int. Cl.² B65H 75/00, 49/30
U.S. Cl. 242—54 R 3 Claims

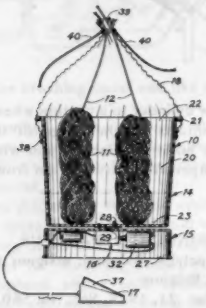
1. A hand knitting or crocheting aid for holding two or more skeins of yarn or thread to enable a person to knit or crochet an object without counter-clockwise twisting the yarns or threads about each other between the skeins and the object as the object is being produced, comprising:

an upright open skein receiving container of sufficient size to receive two or more skeins having free ends in an upright orientation;

a flexible fabric covering attached to the container about an open end of the container with the fabric extending upward to an open end;

drawstring means at the upper end of the flexible fabric covering for drawing the covering open end partially closed to form a small opening for the free ends of the skeins to extend therethrough while covering the container to prevent the skein from being pulled from the container when the covering open end is partially closed;

a base member for supporting the skein receiving container in an upright orientation;



mounting means on the base member for supporting the container for rotational movement relative to the base member about a fixed axis;

drive means operatively connected to the mounting means for selectively rotating the container in a clockwise rotation about the fixed axis; and

control means operatively connected to the drive means for selectively activating the drive means for rotating the container clockwise to prevent counter-clockwise twisting of the two or more threads or yarns between the skeins and the object as the object is being knitted or crocheted.

4,004,746

CASSETTE MAGAZINE FOR MOTION-PICTURE FILMS

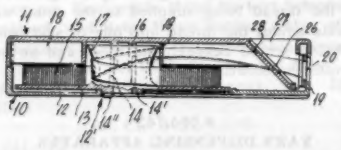
Angela Aruanno, Milan, Italy, assignor to Lamy S.r.l., Milan, Italy

Filed Jan. 23, 1974, Ser. No. 435,958

Claims priority, application Italy, Jan. 25, 1973, 19585/73; Nov. 21, 1973, 31525/73

Int. Cl.² G11B *23/10*

U.S. Cl. 242—55.19 A **6 Claims**



1. A cassette magazine for an endless motion picture film in the form of a wound roll comprising, in combination, a substantially flat container having a bottom wall provided with an access opening, a side wall and a top wall defining an interior, said side wall having a film exposure opening, said film being arranged to be advanced adjacent said film exposure opening to continuously unwind the innermost turn of the film roll and to wind the outermost turn of the roll on the outer periphery of the roll, a film roll supporting disc having a central hub rotatably mounted on said container bottom wall in said container interior in coaxial alignment with said bottom wall access opening for connection of said disc to associated projector driving means, a levelling member supported on said disc for retaining engagement with the side edges of the turns of film in the roll, said levelling member including a pair of radially extending arms arranged in angularly disposed relationship, one of said arms extending at least to the outer periphery of the film roll on said disc and the other of said arms having a free end terminating radially inward of the film roll outer periphery, means on said container engageable with said levelling member for preventing rotation of said levelling member and for permitting limited axial movement of said levelling member on said disc including a recess on said container for slidably accommodating the free end of said one arm, a spool supported on said disc in coaxial relationship therewith, said spool extending upwardly through the film roll on said disc and having an upper end disposed above the film roll adjacent said container top wall, said spool having a circular cross-sectional shape for guiding engagement with the innermost turn of the film roll on the disc during the advance of the film and to promote separation of the innermost turn of the film, a presser pad member in said container interior for maintaining the advancing film adjacent said film exposure opening, and means for guiding the advancing film from said spool to said presser pad member and means for guiding the advancing film from said presser pad member to the roll.

4,004,747

WINDING APPARATUS

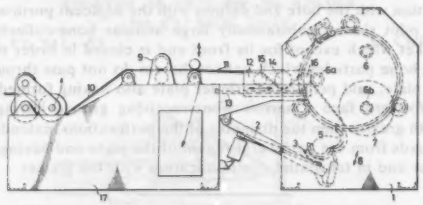
Wilhelm Schulze, Delligsen, Germany, assignor to Maschinenbau Greene GmbH & Co., KG, Kreiensen, Germany

Continuation of Ser. No. 442,878, Feb. 15, 1974, abandoned. This application June 23, 1975, Ser. No. 589,029

Claims priority, application Germany, Nov. 9, 1973, 2232338

Int. Cl.² B65H *35/02, 35/04*

U.S. Cl. 242—56.5 **2 Claims**



1. Apparatus for slitting a continuous web of material into a plurality of spaced webs and for transferring said webs onto winding cores, comprising

a machine frame to which said continuous web of material is supplied,

a plurality of said winding cores adapted to be rotatably driven to wind said web of material thereon,

means for selectively moving said cores into and out of a winding position,

a pressure roller biased toward the respective one of said cores in said winding position,

means carried by said machine frame for feeding a continuous web of material between said pressure roller and the one of said cores in said winding position,

a separating element having a web cutting edge extending transversely across said web for swinging movement into a web separating position to transversely cut said web to provide a free edge for attachment to another one of said winding cores,

a pair of mutually parallel spaced rails mounted to said machine frame and extending in the direction of movement of said web to said winding position,

a support device mounted on said rails for reciprocal rectilinear movement thereon,

said pressure roller being mounted on said support device,

(a web spacing roller carried by said support device in fixed spaced relationship with said pressure roller, and)

web slitting means mounted on said frame upstream of said spacing roller for slitting said continuous web into a plurality of adjacent longitudinal web sections, and

a web spacing roller carried by said support device in fixed spaced relationship with said pressure roller to expand the width of said web coming from said slitting means,

whereby said continuous web of material is slit into a plurality of separate continuous webs, which webs are subsequently spaced apart and then wound on said winding cores.

4,004,748

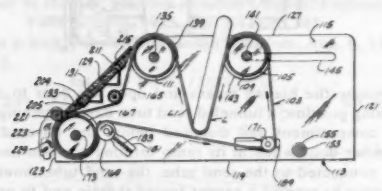
APPARATUS FOR DISPENSING FABRIC FROM A BOLT

Gail B. Schwarz, Belleville, Ill., assignor to The Measuregraph Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 477,166, June 6, 1974, abandoned. This application Mar. 20, 1975, Ser. No. 560,358

Int. Cl.² B65H *75/02, 17/02*

U.S. Cl. 242—62 **22 Claims**



1. Apparatus for dispensing fabric from a bolt comprising an endless belt conveyor, means guiding the conveyor for travel in an endless path including an upwardly opening loop in which a bolt may be cradled with the bolt extending transversely of the conveyor, means for driving the conveyor to rotate a bolt cradled in the loop to unwind fabric from the bolt, said guiding means including a first and a second guide for establishing said loop, the conveyor travelling over the first guide, thence downwardly, upwardly and over the second guide, and said apparatus having means mounting said guides for relative movement toward and away from one another as the bolt rotates, said guides being relatively movable from one another as the bolt rotates to a horizontal position and toward one another as the bolt rotates away from horizontal position.

4,004,749

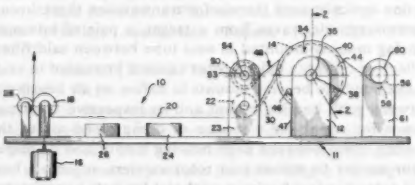
ELECTROGRAPHIC PRINTER PAPER TENSIONING DEVICE

Robert F. Strange, Round Rock, Tex., assignor to Bausch & Lomb Incorporated, Rochester, N.Y.

Filed Oct. 28, 1975, Ser. No. 625,995

Int. Cl.² B65H *23/06, 59/16*

U.S. Cl. 242—75.4 **27 Claims**



1. An electrographic printer recording medium tensioning device, comprising:

a base;

an electrographic recording medium support device carried by the base and having a curved surface for contacting one surface of the recording medium substantially across its width;

at least one constant-force spring having first and second ends and a connecting portion therebetween, the first and second ends being mounted to said base to dispose the connecting portion tp bear constantly and evenly against the other surface of the recording medium forcing it into contact with the curved surface of the recording medium support device for tensioning the recording medium.

4,004,750

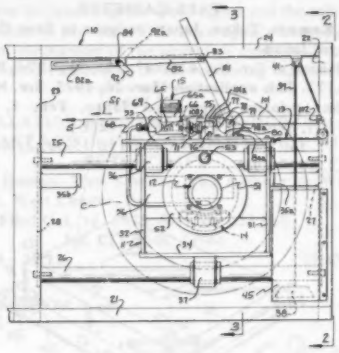
METHOD AND APPARATUS FOR CONTROLLING THE STOCK TENSION AS IT IS WITHDRAWN FROM A COIL

Earl M. Seagrave, Jr., Rockford, Ill., assignor to Antek, Inc., Rockford, Ill.

Filed Aug. 29, 1975, Ser. No. 609,107

Int. Cl.² B65H *75/22;* **B21C** *47/16*

U.S. Cl. 242—75.43 **16 Claims**



1. A flexible stock pay-off apparatus for controlling tension on continuous flexible stock as it is withdrawn from a coil, the pay-off apparatus including a frame, a carriage mounted on the frame for movement relative thereto along a path between a retracted position and an extended position, a coil support mounted on the carriage for rotation about an axis transverse to said path in response to withdrawal of stock from a coil on the support, means yieldably urging the carriage along said path toward said retracted position, variable brake means for controlling rotation of a coil on said coil support, and means operative in response to movement of the carriage along the path for variably operating the brake to increase and decrease the braking action as the carriage moves respectively toward and away from said retracted position.

4,004,751

SAFETY BELT INERTIA RETRACTOR AND BACKING DEVICE

Per Olaf Weman, Haslah, and Harald Martin Schmelow, Ellerau, Krs. Segeberg, both of Germany, assignors to Sigmatex, A.G., Basel, Switzerland

Filed Nov. 25, 1974, Ser. No. 527,008

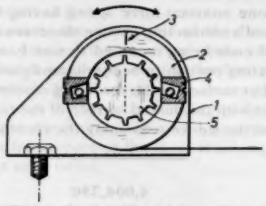
Claims priority, application Germany, June 21, 1974, 2429801

Int. Cl.² B65H *75/48*

U.S. Cl. 242—107.4 A **15 Claims**

1. A belt winder for a safety belt for vehicles with quick-action locking means, comprising a housing, a winding shaft for the safety belt, a locking mechanism arranged between the housing and the winding shaft, a mounting support on the winder, said mounting support having a pocket therein, an

inert mass mounted in the pocket, said pocket being open at one side, said mass moving to lock the winder shaft when the vehicle accelerates in at least one of the three directions in space, the mounting support comprising a ring mount having



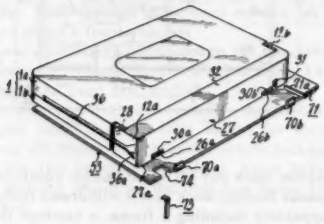
an adjusting cylinder arranged therein so that the adjusting cylinder can selectively be rotated about its longitudinal axis, the ring mount being selectively rotatable about an axis perpendicular to the longitudinal axis of the adjusting cyclinder.

4,004,752

TAPE CASSETTE

Naoki Kamaya, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Division of Ser. No. 438,447, Jan. 31, 1974, Pat. No. 3,900,172. This application Mar. 26, 1975, Ser. No. 562,120
Claims priority, application Japan, Feb. 1, 1973, 48-14227[U]; Sept. 25, 1973, 48-11572[U]
Int. Cl.² G03B *1/04*; G11B *15/32*, *23/04*
U.S. Cl. 242—198 **4 Claims**



1. A tape cassette comprising:

a. a housing of generally rectangular configuration containing at least one reel for a supply of tape and having top and bottom walls and a peripheral wall extending between said top and bottom walls along sides of the housing so as to leave an opening along at least one side of the housing through which the tape can be withdrawn;

b. braking means contained in said housing and being normally applied for preventing rotation of said reel; and

c. means for releasing said braking means in response to the insertion of said housing into a holder therefor in a selected one of at least two orthogonally related directions one of which directions extends parallel to said one side of the housing.

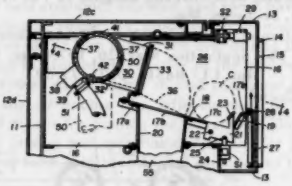
4,004,753

PNEUMATIC CUSTOMER TERMINAL FOR DRIVE-UP BANKING INSTALLATIONS

William D. Thomas, Marion, Iowa, and Chadwick C. Boltz, Kansas City, Mo., assignors to Walter Kidde & Company, Inc., Clifton, N.J.

Filed Nov. 6, 1975, Ser. No. 629,327
Int. Cl.² B65G *51/32*
U.S. Cl. 243—19 **6 Claims**

1. In a customer terminal for a pneumatic banking system having carrier send and receive tubes opening up through the terminal, the terminal including a compartment therein opening through a terminal front wall for access by customers, the compartment having a pair of forwardly disposed opposite side walls spaced apart a width greater than the axial length of a generally cylindrical carrier for use with the system, the improvement comprising: a carrier receive chamber disposed at the rear of and having a transverse front opening into the compartment; an air return tube opening into the chamber; a transverse door closing the front opening of the chamber and hinged to open forwardly and downwardly into the compartment between its side walls, the receive tube opening into the chamber so that a carrier entering the chamber is disposed therein in a horizontal attitude with its axis transversely of the compartment side walls and is directed against the door, the door forming when open a forwardly and downwardly inclined carrier ramp from the chamber down which a carrier disposed in the chamber as aforesaid will roll therefrom; means normally biasing the door to its closed position and effective so that a carrier when disposed as aforesaid against the door will



overcome the biasing means and open the door to its ramp forming position; a funneled send tube mouth opening up into the compartment and disposed below and covered by the chamber door when in its ramp forming position and above and connected to the send tube, the send tube mouth being effective to receive a carrier tossed therein and to orient the carrier into an upright position so that the weight of same dispatches the carrier end first down the send tube, the compartment side walls and the door when closed closely surrounding the adjacent margins of the send tube mouth; and carrier receiving means in the compartment disposed forwardly of the send tube mouth and the forwardmost edge of the chamber door when in its ramp forming position, the carrier receiving means being effective to halt and retain a carrier in position for access by a customer through the front of the compartment after the carrier has rolled forwardly off the rear face of the door and disposed to thereafter allow the biasing means to close the door.

4,004,754

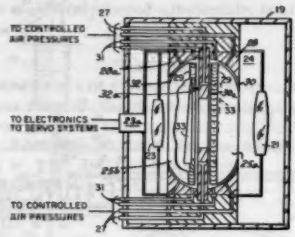
HIGH-SPEED, HIGH-G AIR BEARING OPTICAL MOUNT FOR ROSETTE SCAN GENERATOR

Mary V. Cox, Huntsville, and Rayburn K. Widner, Arab, both of Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed July 11, 1974, Ser. No. 487,843
Int. Cl.² F41G *7/12*
U.S. Cl. 244—3.16 **4 Claims**

1. A scan generator comprising: a tube with filter and collection optics spaced therein for transmission therethrough of electromagnetic waves from a target, a pair of intermediate bearing mounts mounted in said tube between said filter and collection optics, a pair of rotor carriers journaled in said pair of intermediate bearing mounts to define an air bearing space between each bearing mount and its respective rotor carrier, means for supplying a source of compressed air to the air bearing space between each bearing mount and its respective rotor carrier to mount said rotor carriers on an air bearing, said rotor carriers having peripheral buckets in registery with compressed air supplied through said bearing mounts for application of discrete pressures to the buckets to produce relative rotations of the rotor carriers, said rotor carriers being

centrally pierced and having optical prisms oppositely disposed on the respective rotor carriers to direct said electro-



magnetic waves from a predetermined target scan pattern to said collection optics for transmission to a detector.

4,004,755

VTOL AIRCRAFT WITH COMBINED AIR BRAKE AND DEFLECTOR DOOR

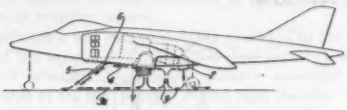
Ralph Spenser Hooper, Richmond-upon-Thames, England, assignor to Hawker Siddeley Aviation Limited, England

Filed July 30, 1975, Ser. No. 600,305

Claims priority, application United Kingdom, Aug. 6, 1974, 34680/74

Int. Cl.² B64C *15/08, 9/32*

U.S. Cl. 244—12.5 **6 Claims**



1. An aircraft of the fixed wing vertical take-off and landing type employing jet-engine-efflux-discharging vectored thrust lift nozzles for take-off and landing which nozzles are angularly movable to positions in which said nozzles provide thrust for forward flight, comprising a hot gas deflector door incorporating edgewise air blowing means and movably mounted on the underside of the aircraft fuselage such that said door is movable from a retracted position, in which said door may conform to the fuselage profile, to a fully open position in which said door is directed forwardly and downwardly.

4,004,756

AUTOMATIC FLIGHT CONTROL MEANS FOR ROTARY WING AIRCRAFT

Milton I. Gerstine, Wilmington, Del.; Joshua I. Goldberg, Ridgefield, Conn.; Setsuo Futatsugi, Kagamigahara, Japan; Kazuo Ueda, Kagamigahara, Japan; Ryozo Seo, Kagamigahara, Japan; Koji Iwasaki, Kagamigahara, Japan, and Makoto Uemura, Kagamigahara, Japan, assignors to The Boeing Company, Seattle, Wash.

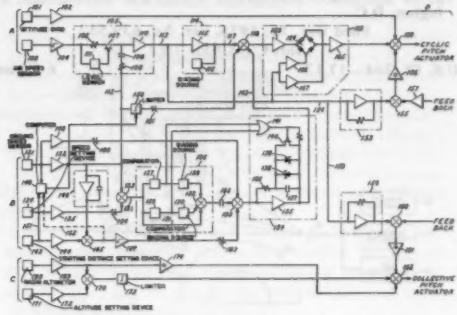
Filed Nov. 24, 1975, Ser. No. 634,380

Claims priority, application Japan, Nov. 22, 1974, 49-134512

Int. Cl.² B64C *19/00*; G05D *1/08*

U.S. Cl. 244—17.13 **3 Claims**

1. Automatic flight control means for rotary wing aircraft comprising speed detecting means for detecting speed of a rotary wing aircraft and generating a speed signal, starting distance signal generating means for providing a starting distance signal corresponding to the starting distance between a control starting spot to a desired hovering spot, reference signal generating means connected with the speed detecting means and the starting distance signal generating means for providing from the speed signal and the starting distance signal, a reference signal corresponding to the remaining distance to the desired hovering spot, and means connected with the speed detecting means and the reference signal gen-



erating means for receiving the speed signal and the reference signal therefrom to provide a difference signal whereby cyclic pitch control mechanism of the aircraft is controlled so as to attain a speed corresponding to the remaining distance.

4,004,757

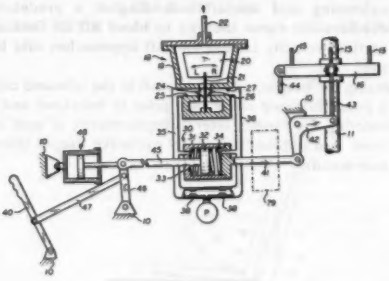
OSCILLATION DAMPER FOR THE HUB OF A ROTORCRAFT ROTOR AND ITS COMBINATION WITH A ROTORCRAFT

Glidden S. Doman, West Chester, Pa., assignor to William Gallagher, West Chester, Pa.

Filed Oct. 16, 1975, Ser. No. 623,008

Int. Cl.² B64C *11/44*

U.S. Cl. 244—17.13 **18 Claims**



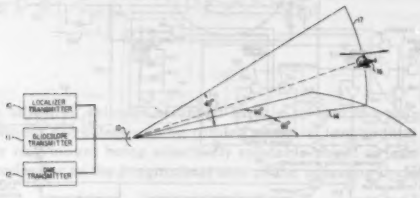
1. An oscillation damper for the hub of a rotor of a rotorcraft having blades extending outwardly from the hub with the pitch of the blades being controlled by a swash plate which rotor is adapted to be rotated at a cruising r.p.m. comprising a seismic device having a housing, a weight mounted for movement in the housing, weight spring means engaging the weight and maintaining the weight in central position in the housing, the weight and its spring means being tuned to the frequency of the lateral aeromechanical instability or approximately at one half of the r.p.m. of the rotor at cruising speed, weight damping means one half critically damping the response of the weight to secure a vector force lag of approximately 15°, control means connected with the weight and controlled by the movement thereof including a first controller and a second controller, an extendable and contractable motor means connected with the control means and controlled by the movement of the first controller to expand the motor means and controlled by the movement of the second controller to contract the motor means, and connecting means carried by the motor means and adapted to be connected with a swash plate.

4,004,758

METHOD AND APPARATUS FOR PROVIDING DECELERATED AIRCRAFT APPROACH

Robert P. Boriss, Holmdel, and Thomas F. McNamara, New Shrewsbury, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 10, 1975, Ser. No. 639,552
Int. Cl.² G05D *1/12*
U.S. Cl. 244—17.13 **6 Claims**



1. A method of providing a decelerated approach for a rotary winged aircraft towards a landing site, wherein it is assured the heading of the aircraft at breakout corresponds to the inbound course, which comprises:

transmitting a plurality of radio beams outwardly from said landing site towards said aircraft, said beams having encoded thereon information relative to said aircraft's azimuth, elevation, range and range rate and defining a desired approach path towards said landing site;

decoding said plurality of encoded radio beams, on said aircraft, thereby to derive signals representative of the aircraft's instantaneous azimuth, elevation, range and range rate;

correcting the heading of said aircraft, responsive to said signals, to fly said aircraft along said approach path towards the landing site, while simultaneously;

decelerating said aircraft according to a predetermined deceleration curve thereby to bleed off all forward and vertical velocity as said aircraft approaches said landing site;

freezing the heading of said aircraft to the inbound course at a predetermined range rate prior to breakout and then

correcting for further lateral displacement of said aircraft from said approach path by exclusive use of lateral roll commands.

4,004,759

VERTICALLY-FLYING AIRCRAFT

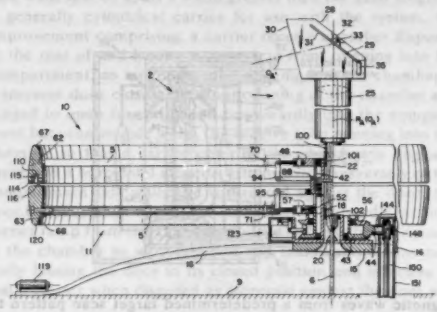
Roland Hund, Immenstaad, Germany, assignor to Dornier System GmbH, Germany

Filed June 10, 1975, Ser. No. 585,528
Claims priority, application Germany, July 16, 1974, 2434042
Int. Cl.² B64C *27/20*
U.S. Cl. 244—17.17 **10 Claims**

1. A vertically-flying aircraft having no on-board engine and being adapted to fly while moored to a ground station, comprising at least one rotatable rotor means for producing vertical thrust,

mechanically-acting storage means for storing at least a substantial portion of the required drive energy for the drive of said rotor means,

and coupling means adapted to connect said rotor means to



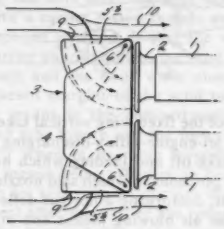
a drive means of a ground station, whereby drive energy is stored in said rotor means.

4,004,760

DEVICE FOR PREVENTING FOREIGN MATTERS FROM BEING SUCKED INTO A GAS TURBINE ENGINE FOR AN AIRCRAFT

Kiyoatsu Ando; Hiroshi Nakajima, and Hiroshi Ueno, all of Nagoya, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 25, 1975, Ser. No. 561,869
Int. Cl.² B64D *33/02*
U.S. Cl. 244—53 B **2 Claims**



1. A device for being mounted in front of an aircraft engine air intake to prevent foreign matter from being sucked into the engine, said device comprising:

a first, fixed portion for extending as a deflector before the air intake and having a cutaway, open area for exposing at least part of the air intake to air flow directly ahead of the air intake;

a second, movable portion having an inlet region communicating therethrough to an outlet region thereof, and a deflector region extending between the inlet region and outlet region; and

pivot means mounting the second, movable portion upon the first, fixed portion for movement between these two positions:

a. a first inactive position, wherein the outlet region of the movable portion is positioned directly ahead of the air intake, the deflector region thereof is substantially telescoped with said first, fixed portion so to substantially inactivate the deflecting ability of said deflector region, and wherein the inlet region of the movable portion is positioned directly ahead of the air intake, so that at least some of the air passing through said device to the air intake need not be substantially deflected to do so; and

b. a second, active position, wherein the outlet region of the movable portion remains positioned directly ahead of the air intake, but the deflector region is extended across that

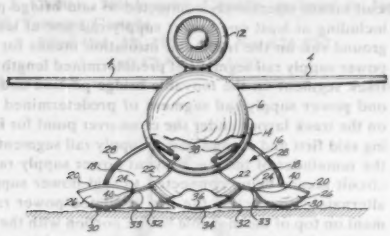
part of the region directly ahead of the air intake that is exposed in said first, inactive position, and the inlet region of the movable portion is positioned directly ahead of one edge of the air intake, so that air to enter the air intake must first proceed substantially laterally.

4,004,761

OUTRIGGER AIR CUSHION LANDING SYSTEM

John Jerome McAvoy, Seattle, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed May 10, 1976, Ser. No. 684,801
Int. Cl.² B60V *3/08*
U.S. Cl. 244—100 A **4 Claims**



1. An air cushion landing system for an aircraft having a fuselage comprising:
   a. rigid member means having a first and second portion, the first portion mounted to the fuselage of the aircraft, and the second portion mounted to the first portion of said rigid member means;
   b. first inflatable bag means sealably mounted to the underside of the second portion of said rigid member means;
   c. second inflatable bag means sealably mounted to the underside of the first portion of said rigid member means;
   d. flap means mounted to the underside of the first portion of said rigid member means for containing a volume of air between said flap means and said first and second inflatable bag means;
   e. inflating means for inflating said first and second inflatable bag means whereby said first and second inflatable bag means cushion the aircraft at landing;
   f. actuating means connected to the aircraft and to said rigid member means for extending said rigid member means and said first and second inflatable bag means during landing and retracting said rigid member means and said first and second inflatable bag means during cruise operation.

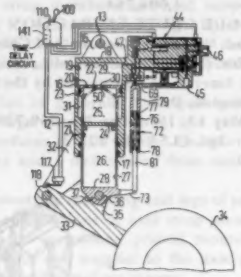
4,004,762

AIRCRAFT UNDERCARRIAGE WITH RIDE CONTROL MEANS

Stanley Frederick Noel Jenkins, Leamington Spa, England, assignor to Automotive Products Company Limited, Leamington Spa, England

Filed June 3, 1975, Ser. No. 583,424
Claims priority, application United Kingdom, June 6, 1974, 25248/74; Sept. 9, 1974, 39322/74
Int. Cl.² B64C *25/60*
U.S. Cl. 244—104 FP **14 Claims**

1. An aircraft undercarriage for supporting an aircraft structure comprising:
   a ground contacting element;
   a variable length liquid filled strut operatively connected to the aircraft structure and to the ground contacting element for supporting a proportion of the weight of the aircraft structure;
   resilient means for controlling the length of said strut in dependence on the load supported thereby;
   a movable wall acting on said resilient means in a direction to increase the load thereon under the pressure of liquid in the liquid filled strut;
   a liquid pressure source and a liquid drain;
   ride control valve means to selectively connect said strut to said source and said drain;
   a ride control mechanism operatively connected to the



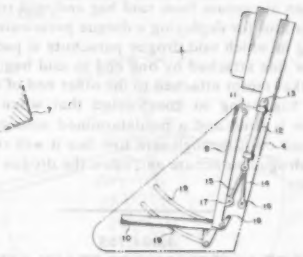
ground contacting element and the aircraft structure for sensing relative movement therebetween, and to the ride control valve means for maintaining the length of said strut constant with varying aircraft static load;
and further valve means operative to isolate said strut from said source and said drain except when the aircraft is supported on the ground by the ground contacting means.

4,004,763

ARTICULATED HIGH "G" PILOT'S SEAT

Frederick E. Bunnell, III, Burbank, and Henry G. Combs, Canyon Country, both of Calif., assignors to Lockheed Aircraft Corporation, Burbank, Calif.

Continuation-in-part of Ser. No. 488,426, July 15, 1974, abandoned. This application Sept. 2, 1975, Ser. No. 609,214
Int. Cl.² B64D *25/02*
U.S. Cl. 244—122 R **7 Claims**



1. An articulated high "G" force aircraft seat comprising:
   a rail assembly attached to and constituting an integral aircraft structure;
   a seat assembly supported on said rail assembly and movable relative thereto for ejection;
   a headrest having a rear portion and a forward or helmet receiving portion, said rear portion being secured to said seat assembly, guide means connecting said forward portion to said rear portion for movement of said forward portion about a pivot axis generally coaxially aligned with the intended center of azimuth rotation for the helmeted head of a seat occupant, said forward portion having helmet engaging means requiring said forward portion to move with the helmet in azimuth but not in elevation whereby near normal head motion of the seat occupant may be maintained under high "G" force conditions;
   a seat back pivotally attached at one end approximate normal shoulder height to the seat assembly adjacent said headrest;

a seat pan pivotally attached to the other end of the seat back; and

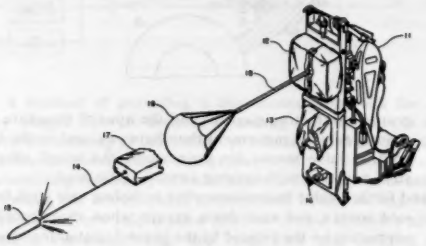
actuator means for moving the seat pan and said other end of the seat back between a normal sitting position and a reclined position.

4,004,764

DROGUE CHUTE EXTRACTION

Vernon D. Burklund; W. James Stone, both of China Lake, and Joseph A. Schmidt, Ridgecrest, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 13, 1974, Ser. No. 469,739
Int. Cl.² B64D *17/72*
U.S. Cl. 244—149 **4 Claims**



1. A method for deploying a drogue parachute, said method comprising the steps of:

igniting a rocket motor which is attached by means of a tow line to a closed bag containing a drogue parachute packed into the closed bag;

pulling, by means of said rocket motor and said tow line, the bag and drogue parachute therein through the air; and

ripping said bag off said drogue parachute through the action of said motor for releasing said drogue parachute into an air stream from said bag and said rocket motor.

2. Apparatus for deploying a drogue parachute comprising:

a. a bag in which said drogue parachute is packed;

b. a tow line attached by one end to said bag; and

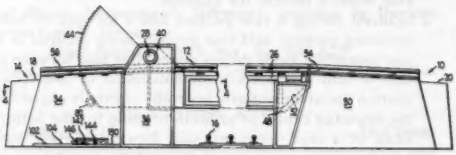
c. a rocket motor attached to the other end of said tow line; said bag being so constructed that when said rocket motor is fired and a predetermined amount of force is exerted on it through said tow line it will rip away from said drogue parachute and allow the drogue parachute to deploy.

4,004,765

BRIDGE ACCESSORY FOR TRACK VEHICLES

Gordon A. Barlow, Evanston, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.

Filed Feb. 9, 1976, Ser. No. 656,113
Int. Cl.² B61L *23/04*
U.S. Cl. 246—118 **6 Claims**



1. A bridge accessory for use with a model vehicle set having an electrically conductive track layout for defining a path of travel and supplying power to the model vehicle, and including at least one cross-over point in the track layout, comprising:

a frame structure at the cross-over point;

a bridge portion including a movable track segment pivotally mounted on the frame, said bridge portion being movable between a down position where the model vehicle may pass over the bridge portion and an up position where the model vehicle may pass under the bridge portion;

a selectively operable drive means connected to the movable bridge portion and a power supply for selective movement of the bridge portion between its respective up and down positions, said bridge portion having an arcuate gear rack adjacent the pivoted end thereof and said drive means includes a pinion gear in engagement with said gear rack for moving the bridge portion between its up and down positions by rotation of said pinion gear in a predetermined direction;

circuit means operatively connected to said bridge portion including at least one power supply rail and at least one ground rail on the track and insulation means for a first power supply rail segment of predetermined length on the track segment on the movable bridge portion and a second power supply rail segment of predetermined length on the track layout under the cross-over point for insulating said first and second power supply rail segments from the remainder of the track layout power supply rail, said circuit means being connected to said power supply for alternately connecting the first insulated power rail segment on top of the movable bridge portion with the power supply when the bridge is in its down position and the second insulated power supply rail segment under the cross-over point with the power supply when the bridge is in its up position; and

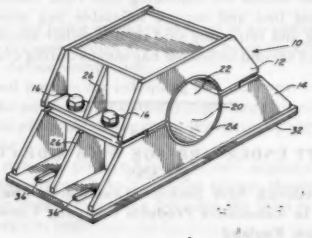
sounding means connected to said drive means for producing an audible signal when the bridge portion is in motion, said sounding means including a bell and a movable hammer adjacent said bell and cam means associated with said hammer and the drive means for causing the hammer to strike the bell as the drive means is energized.

4,004,766

ISOLATION CLAMP FOR TRANSMISSION TUBE

William W. Long, 7501 W. 61st No. 134, Overland Park, Kans. 66202

Filed Oct. 28, 1975, Ser. No. 626,118
Int. Cl.² F16L *3/16*
U.S. Cl. 248—55 **5 Claims**



1. A vibration absorbing transmission tube isolation clamp which effectuates reduction of transmittance upon structures in communication with a tube being held by the clamp of side to side forces generated by thermal expansion of the tube as the tube transmits liquid under pressure, the clamp comprising:

a. a bottom piece which has tube housing to surround one-half of a transmission tube and which housing has a vibration absorbing low coefficient of friction material therein, and with the base of the bottom piece being provided on each side of the tube housing with one or more elongated openings whose long axes are at right angles to and lateral to the longitudinal axis of the tube housing and further with the base having its underside provided with a low

coefficient of friction material situated to interface with the support structure when the clamp is in use; and

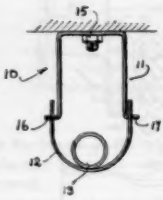
b. a top piece having a tube housing to surround one-half of the transmission tube and which housing has a vibration absorbing low coefficient of friction material therein, with the top piece securable to the bottom piece so that when so secured to the bottom piece the tube housing contributed by the bottom piece and the top piece together totally surround the transmission tube when the transmission tube is situated between the top piece and the bottom piece.

4,004,767

PIPE HANGER

Dennis J. Chilton, Mississauga, Canada, assignor to Joseph Zentil, Toronto, Canada

Filed Oct. 28, 1975, Ser. No. 626,232
Int. Cl.² F16L *3/00*
U.S. Cl. 248—58 **4 Claims**



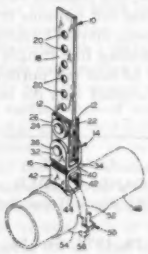
1. A pipe-supporting assembly comprising in combination a hanger and a saddle, said assembly being characterized in that said hanger includes a pair of spaced and parallel oppositely and outwardly projecting tongues each having a pair of spaced co-planar slots therein opening upon the opposite side-edges of said tongues, said saddle being suspended from said tongues and having a pair of spaced substantially circular apertures therein and an open-ended substantially radial slot extending between each aperture and the ends of said saddle, said slots permitting said saddle to engage said tongues and be supported rotatably thereby between said co-axial slots.

4,004,768

UNIVERSAL JOINT HANGER FOR TAILPIPES AND THE LIKE

Ralph K. Evans, Plantsville, and Roy S. Florian, Southington, both of Conn., assignors to Nickson Industries, Inc., Plantsville, Conn.

Filed Aug. 13, 1975, Ser. No. 604,227
Int. Cl.² E21F *17/02;* **F16L** *3/00*
U.S. Cl. 248—59 **6 Claims**



1. A pipe hanger comprising:

a. a pair of closely spaced strap members each having first and second end portions at opposite ends thereof and extending in parallel planes;

b. an elongated sheet-like support member having a thickness less than the thickness of either of said strap members, said support members having a planar engagement portion and a support portion at opposite ends thereof, said engagement portion extending in a parallel plane between the planes of said strap members and being disposed between said first end portions of said closely spaced strap members and said support portion being adapted for mounting said hanger upon a support surface;

c. means pivotably mounting said first end portions of said strap members to said engagement portion of said support member;

d. a bracket of generally U-shaped configuration having spaced legs extending along and closely adjacent the outer surfaces of said second end portions of said strap members and a web spaced from said second end portions;

e. means pivotably mounting said legs of said bracket to said second end portions of said strap members, the axis of said second mentioned pivotal mounting means being aligned with and parallel to the axis of said first mentioned pivotal mounting means;

f. hanger means depending from said bracket web and adapted to provide pipe support means;

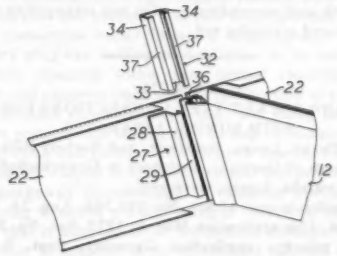
g. means pivotably mounting said hanger means to said bracket web adjacent the midpoint thereof whereby said bracket will pivot said hanger means about an axis lying in substantially the same plane as that of said engagement portion of said support member and said pivotal axes of said bracket mounting means and of said support member with said strap members are substantially parallel during pivoting.

4,004,769

DETACHABLE END PLATFORM FOR MERCHANDISE DISPLAY UNIT

Muammer A. Oztekin, P.O. Box 6247A, Birmingham, Ala. 35217

Filed Feb. 19, 1976, Ser. No. 659,535
Int. Cl.² F16M *11/20*
U.S. Cl. 248—188.1 **4 Claims**



1. In a detachable end platform for merchandise display unit embodying at least one upstanding shoe member formed of adjacent parallel plates and extending generally perpendicular to at least one upstanding side plate with the outer end of said shoe member terminating adjacent one end of said side plate, means detachably connecting said one end of said side plate to said outer end of said shoe member comprising:

a. an outwardly opening recess in said outer end of said shoe member between said adjacent parallel plates,

b. an upstanding bracket carried by the inner side of said side plate in spaced relation to said one end thereof, said bracket having one end fixed to said side plate and further comprising a first portion extending away from said side plate, a second, laterally extending portion extending from said first portion and substantially parallel to said plate, and terminating in a third portion extending toward said plate, and,

c. a channel-like clip having a web slidably engaging the inner surface of said plate with one flange of said clip extending into an engaging said outwardly opening recess and the other flange of said clip engaging the inner surface of said upstanding bracket so that said clip connects said side plate to said shoe member.

4,004,770

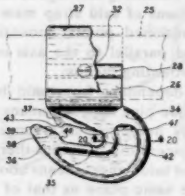
HOOK AND HOOK ASSEMBLY USING A SLING OF BAND MATERIAL

Thomas J. Karass, 411 Kindersley Ave., Mount Royal, Quebec, Canada

Continuation-in-part of Ser. No. 353,567, April 23, 1973. This application Nov. 26, 1974, Ser. No. 527,297

Int. Cl.² F16M *13/00*

U.S. Cl. 248—323 **6 Claims**



1. A hook for suspending a sling of band material therefrom comprising a suspending portion, an intermediate generally flat portion and a hooking portion joined together into a generally J-shaped configuration, said flat portion being as long as the width of said band material and interconnecting said suspending portion and said hooking portion, a protuberant lip portion attached to said suspending portion, positioned between said suspending portion and said hooking portion and forming a reduced spacing between the same which is smaller than the width of said band material, said protuberant lip portion having a lower edge which overlies said flat portion and which forms a downwardly extending boss at its outer end, said boss having a portion which is lower than the uppermost point of said hooking portion and a sleeve portion integrally formed with said suspending portion and arranged to slidably engage around a tubular rail.

4,004,771

BALL-AND-SOCKET TYPE CONNECTIONS FOR USE WITH MINING APPARATUS

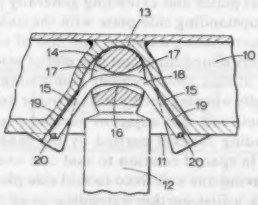
Lubomir Plevak, Lunen, Horstmar, and Norbert Hölken, Altlunen, both of Germany, assignors to Gewerkschaft Eisenhutte Westfalia, Lunen, Germany

Continuation-in-part of Ser. No. 391,366, Aug. 24, 1973, abandoned. This application Mar. 5, 1975, Ser. No. 555,747

Claims priority, application Germany, Sept. 9, 1972, 2244312

Int. Cl.² E21D *15/55*

U.S. Cl. 248—357 **24 Claims**



1. A ball-and-socket type connection for connecting an elongate component and a support prop of a mine support assembly, said connection comprising; a ball part provided on the support prop; a socket part provided on the elongate component; said socket part being shaped to receive said ball part and having a mouth at a side thereof through which the ball part can be introduced, and separate securing means comprising at least one unitary member extending into the socket part through the mouth to engage within the ball part, the unitary member being introducable into the ball part through the mouth and being detachably connected to the elongate component at one or more positions directly accessible from the side of the component in which the mouth is formed to maintain the ball part in the socket part.

4,004,772

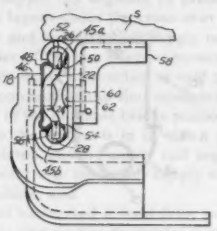
MANUAL SEAT ADJUSTER

Joseph Pickles, Birmingham, Mich., assignor to Ferro Manufacturing Corporation, Detroit, Mich.

Filed Jan. 30, 1975, Ser. No. 545,412

Int. Cl.² F16M *13/00*

U.S. Cl. 248—430 **11 Claims**



1. Support structure for a vehicle seat comprising generally horizontally extending front and rear rail portions, each formed of horizontally elongated strip material having its width disposed generally vertically and having a generally horizontal upper edge forming a trackway, a single ball on each portion, an elongated carriage movable longitudinally of said rail portions, said carriage being formed of horizontally elongated strip material with its width disposed generally vertically and having a laterally and downwardly exending top edge portion, defining a downwardly open channel in which said balls are movable as said carriage is moved, pairs of abutments on the top edges of said rail portions and on said carriage engageable with said balls to limit the horizontal movement of said carriage, the top edge portion of said carriage being laterally and reversely arcuately curved to provide for support of said carriage on said balls by contact between said balls and the bottom of said channel, the lower edge of said carriage being laterally and reversely arcuately curved at the said one side of said carriage to provide a ball receiving channel below said rail portions, said rail portions having generally horizontal bottom edges forming trackways, balls interposed between the lower edges of said rail portions and the channel therebelow, and resilient ball retainers formed of spring steel fixed to said rail portions to extend for the full length of the edge portions thereof forming the trackways, and including laterally extending free flanges interposed between the tops and bottoms of said rail portions and said balls to maintain said balls in contact with the bottoms of said channels at all times.

4,004,773

CANDLE MOLD

William R. Binder, 2101 Black Horse Drive, Warrington, Pa. 18976

Filed July 29, 1974, Ser. No. 492,433

Int. Cl.² C11C *5/02*

U.S. Cl. 249—93 **5 Claims**

1. A candle mold which comprises

a hollow tube open at each end having internal and external surfaces,

a candle end former plate below said tube closing the lower end of said tube to provide the top end of the finished candle,

said former plate having a hole for a wick to be passed therethrough,

a flexible one piece end closure cap in gripping engagement with the external surface of said tube and said plate retaining said former plate in position on the lower end of said tube, and sealing the same from leakage,

said closure cap having an opening aligned with said opening in said former plate through which said wick is adapted to extend,

said closure cap opening sized to be in frictional gripping and sealing engagement with said wick but permitting manual upward movement of said wick, and

wick retaining means at the upper end of the tube.

4,004,774

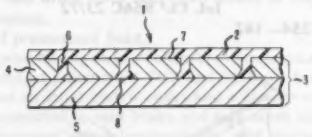
COATED PANEL

Alvin John Houston, Dollard des Ormeaux, Canada, assignor to Du Pont of Canada Limited, Montreal, Canada

Filed Jan. 8, 1975, Ser. No. 539,596

Int. Cl.² B28B *7/36;* **E04G** *9/05*

U.S. Cl. 249—114 **8 Claims**



1. In an improved, reusable concrete form board comprising a composite structure having a coating of a normally solid polyolefin resin at least 10 mils thick on a plywood substrate, the improvement which comprises:

a. providing the substrate with a plurality of circular orifices at its coated surface each having a cross-sectional area in the range of 0.01 to 0.05 square inch disposed over at least the coated surface thereof and spaced with centers from 0.5 to 2 inches apart, said orifices leading into first, cylindrical portions of the holes extending from the coated surface of the solid substrate to a junction line, inside the solid substrate, with a frustoconical portion of the holes whose sides are at an angle in the range of 20°-60° with the vertical axis of the holes and whose cross-sectional area, for at least a part of their depth, increases at least 10% as the distance from said junction line increases, and

b. providing that the normally solid polyolefin resin coating the surface of said substrate penetrates through said orifices and into said holes beyond said junction lines where the cylindrical and frustoconical sections of the holes meet for at least a distance such that the cross-sectional area is at least 10% greater than the area of the orifice at the coated surface of the solid substrate.

4,004,775

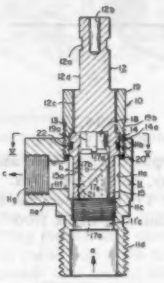
PLUG VALVE

Lloyd K. Jones, and David A. Yanov, both of Morgantown, W. Va., assignors to Elk Manufacturing Company, Inc., Morgantown, W. Va.

Continuation-in-part of Ser. No. 411,246, Oct. 31, 1973, Pat. No. 3,874,637. This application Feb. 6, 1975, Ser. No. 547,697

Int. Cl.² F16K *5/04, 27/06*

U.S. Cl. 251—310 **6 Claims**



1. In an improved fluid-flow controlling valve whose operating parts may be fully assembled and disassembled without disconnecting either its fluid inlet or outlet fittings, a hollow longitudinally extending integral housing having an open first end portion providing a pipe connection inlet fitting and having an opposite open second end portion for the insertion and removal of all operating parts thereof, said housing having a central chamber portion between said open end portions, and having a side outlet portion open to said central chamber portion in substantially a right angular relation with respect to said open first end portion; said side outlet portion providing a pipe connection outlet fitting, a longitudinally extending stationary plug-like seating part adapted to be inserted and removably mounted within said central chamber portion through said opposite open second end portion to extend in a spaced relation concentrically within and along said central chamber portion, said seating part having an end port open to said first open end portion, and an open side port connected by an angular-shaped bore therein to said end port to define a fluid passageway therethrough; a rotatable operating stem part having a sleeve portion integral therewith at one end thereof that is adapted to be introduced through said open second that is adapted to be introduced through said open second end portion into a concentric rotatable operating position about said seating part within said central chamber portion, said sleeve portion having an open end facing towards and closed-off with respect to said open first end portion by said seating part, having a closed-off opposite end, and having an open side port for movement into and alignment with the open side port of said seating part, said stem part having a closed-off operating end portion providing a closed opposite end for said sleeve portion and extending therefrom outwardly through said second open end portion of said housing; said housing having threading about said open second end portion thereof, a bonnet part having threading that is complementary with the threading about said open second end portion for removably securing said bonnet part on said housing, said bonnet and stem parts having interfitting portions for removably retaining said stem part in an operating position within said housing and about said seating part, the interfitting portion of said bonnet being an outwardly offset recess portion,

and the interfitting portion of said stem part being an outwardly projecting annular bearing portion in rotative engagement within said recess portion of said bonnet part; said sleeve portion being positioned in an inwardly spaced relation within said central chamber portion by said annular bearing portion, annular sealing gasket means operatively positioned diagonally between the outer periphery of said seating part and the inside of said sleeve portion for sealing-off spacing therebetween within said central chamber portion in a diagonally cross-extending relation with respect to the side port of said seating part, and said stem and seating parts being endwise-removable from said housing part through the opposite second end portion of said housing after said bonnet part has been unscrewed from said housing.

4,004,776

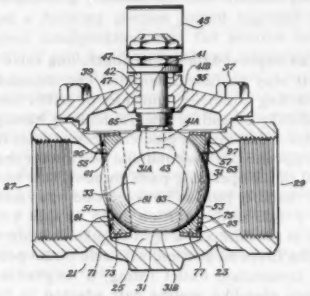
BALL VALVE

Carl H. Stender, Corpus Christi, Tex., assignor to Champlin Petroleum Company, Fort Worth, Tex.

Filed Jan. 17, 1975, Ser. No. 541,713

Int. Cl.² F16K *5/06*

U.S. Cl. 251—315 **2 Claims**



1. A ball valve comprising:

a valve body having a ball receiving cavity with aligned inlet and outlet passages leading to said cavity,

a ball rotatably supported in said cavity between said inlet and outlet passages,

said ball having a hard outer surface formed by a thin layer of ceramic material formed of chrome oxide coated thereon and having an opening extending through said ball,

first and second ring-shaped seats located in said valve body on opposite sides of said cavity,

the inner surfaces of said first and second ring shaped seats defining a portion of said inlet and outlet passages respectively,

each ring-shaped seat comprising an annular cast iron member having a concave seating surface adapted to engage said ball,

a resilient O-ring located between the back side of each ring-shaped seat and wall structure of said valve body to form a seal between the back side of said seats and said wall structure of said valve body,

means for rotating said ball to an open position wherein its opening is aligned with said inlet and outlet passages and to a closed position wherein its opening is out of alignment with said inlet and outlet passages,

said ball and said concave seating surfaces of said annular cast iron members being lapped to a close tolerance fit.

4,004,777

HYDRAULIC TENSIONING DEVICE

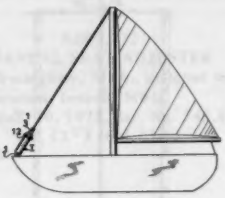
Bernard Despas, Montherme, France, assignor to Societe d'Estampage et de Forge Ardennes Champagne-Sefac, Montherme, France

Filed Dec. 16, 1975, Ser. No. 641,228

Claims priority, application France, Dec. 20, 1974, 74.43545

Int. Cl.² B66F *3/24*

U.S. Cl. 254—51 **11 Claims**



1. An hydraulic tensioning device comprising a casing, an hydraulic pump and an operatively associated jack, a shaft mounted in the casing for slidable guidance in a fixed angular position and being coupled to said jack, said shaft having longitudinally extending notches in its peripheral surface defining raised intermediate portions which are provided with transverse grooves, locking means for locking the shaft in a controlled axial position said locking means comprising a locking ring having a bore which is provided with grooves and notches corresponding with the grooves and notches on said shaft said locking ring being operatively mounted to surround said shaft, actuating means cooperating with said locking ring for moving the ring angularly and externally of said casing so as to mesh the grooves in the bore of the locking ring with the corresponding grooves on said shaft to thereby lock the shaft in an adjusted axial position and to disengage the grooves on the shaft and the ring and permit axial movement of the shaft, said locking ring being keyed to said casing.

4,004,778

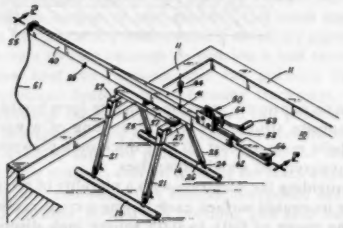
PORTABLE ROOF WINCH

George J. Steinhagen, 7119 W. Roma, Phoenix, Ariz. 85033

Filed Mar. 29, 1976, Ser. No. 671,088

Int. Cl.² B66C *23/72*

U.S. Cl. 254—142 **7 Claims**



1. In a portable roof winch,

a. a collapsible frame for erection on a roof and including a bar which assumes a horizontal position when the frame is erected;

b. an extensible beam secured to said bar by a pivotal mounting and comprising two telescopic parts one of which is secured to said pivotal mounting and presenting a free end and the other of which is moveable relative to said pivotal mounting and having a free end;

c. a pulley on the free end of said part which is secured to the pivotal mounting;

d. a manually operable winch carried by the telescopic part

that is moveable relative to said pivotal mounting and located adjacent to but spaced from the free end of that telescopic part;

e. an operator's seat on the telescopic part on which said winch is mounted between the free end of that part and the winch;

f. mechanism for holding said telescopic parts of the extensible beam in an adjusted position; and

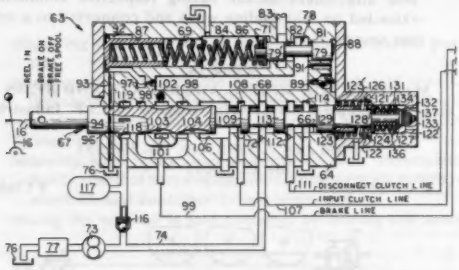
g. a cable that is taken up on said winch passes over said pulley, and has a free end with load engaging means thereon whereby counterbalance is supplied by the weight of an operator sitting on the seat.

4,004,779

WINCH AND FLUID CONTROL SYSTEM THEREFOR

Edward E. Flesburg, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed May 5, 1975, Ser. No. 574,807
Int. Cl.² B66D 1/00
U.S. Cl. 254—187.4 **6 Claims**



1. A winch and fluid control system comprising:

a rotatable drum for receiving and releasing a cable,

drive means for supporting said drum and for selectively transmitting rotary drive thereto, said drive means having a normally disengaged input clutch which engages in response to application of fluid pressure thereto and further having a normally engaged brake for stopping rotation of said drive means and which is releasable by application of fluid pressure thereto and still further having a normally engaged disconnect clutch which disengages said drum from said drive means in response to fluid pressure,

a source of pressurized fluid,

a control valve having an inlet chamber communicated with said source of pressurized fluid and having a brake fluid outlet and an input clutch outlet and a disconnect clutch outlet connected to said brake and said input clutch and said disconnect clutch respectively, said control valve having a valving element shiftable between at least four positions including a Brake-On position at which said inlet chamber is isolated from each of said outlets and a Reel-In position at which said inlet chamber is communicated with said input clutch outlet and said brake outlet while said disconnect clutch outlet is vented and a Brake-Off position at which said inlet chamber is communicated with said brake outlet while said input clutch outlet and said disconnect clutch outlet are vented, and a Free-Spool position at which said inlet chamber is communicated with said disconnect clutch outlet,

resilient centering means for urging said valving element towards said Brake-On position and for resisting movement of said valving element away therefrom, and

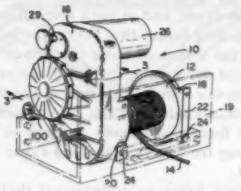
means for creating additional resistance to further movement of said valving element as said valving element approaches said Free-Spool position thereof, said means for creating additional resistance to movement of said valving element being additional resilient means positioned to be distorted by movement of said valving element only upon movement of said valving element into said Free-Spool position thereof from the next adjacent one of said positions thereof.

4,004,780

WINCH

Encho Janaki Kuzarov, Milwaukie, Oreg., assignor to Warn Industries, Inc., Kent, Wash.

Filed Sept. 23, 1975, Ser. No. 615,848
Int. Cl.² B66D 1/00
U.S. Cl. 254—187.4 **7 Claims**



1. In a winch comprising:

a. a drum adapted to have a cable wound thereon,

b. a first power transmitting means operatively connected to said drum,

c. a driven cam member having an axially facing cam surface and having an operative connection to said first power transmitting means, said cam being rotatable in a first direction to cause said drum to turn so as to reel in cable, and rotatable in a second direction to cause said drum to pay out cable,

d. a rotatably mounted second driving cam member having an axially facing second cam surface to engage said first cam surface, said second cam member being rotatable in a first direction to engage said first cam member in wedging engagement to urge said first and second cam members axially away from each other and to tend to drive said cam member in its first direction to reel in cable, and rotatable in a second direction to move away from wedging engagement to permit said first cam member to rotate in its second direction to pay out cable,

e. second power transmitting means to transmit power from a power source to said second drive cam,

f. a brake-clutch assembly comprising:

1. a rotatably mounted ratchet plate,

2. a first shoe mounted on one side of the ratchet plate and connected to the first driven cam so as to rotate therewith,

3. a second shoe mounted on the other side of the ratchet plate and connected to the second cam member so as to rotate therewith,

g. said first and second shoes being connected to said first and second cam members to be movable toward each other and into frictional engagement with said ratchet plate by movement of the first and second cam members axially away from each other, and movable away from each other and out of frictional engagement with the ratchet plate by movement of the first and second cam members axially toward each other, whereby wedging engagement of the two cam members tends to move the shoes into engagement, and movement of the cam members out of wedging engagement permits the shoes to move up out of engagement,

h. said winch being characterized in that:

1. when the winch is rotating in a direction to pay out cable at a constant speed by virtue of an exterior force acting on said drum, there are internal drag forces on the second drive cam including the drag of the second power transmitting means, the second shoe and the second cam member, which drag results in a first axially directed force component being created between the two cam members to urge said cam members away from each other and urge the shoes into engagement,

2. said winch has a practical minimum and maximum operating range with regard to the magnitude of torque loads against which the drum acts, and with the winch reeling in or paying out cable at the practical minimum operating limit, the torque load on the drum, acting back through the driven cam, produces a second axially directed force component tending to move the cams away from each other to cause the shoes to engage,

3. with the shoes disengaged, and with a tension load being applied to the cable so that cable is paying out at an accelerating rate of speed, there is practical upper limit to the level of acceleration of rotational speed of the winch drum, and at such level of acceleration, the frictional drag forces that act on the second drive cam and inertial forces of those components which act on the second drive cam, including the second shoe, the second power transmitting means and the second drive cam itself, are additive, this resulting in a third axially directed force component tending to move the two cams away from each other and cause the shoes to be engaged,

4. said winch being so constructed that the first force component is less than the second force component or the third force component, the improvement comprising:

a. constantly engaged pawl means which engage said ratchet plate in a manner that under all operating conditions of the winch, said ratchet plate is permitted to rotate only in a direction to reel in cable, and

b. biasing means to exert a fourth axially directed force component to urge said shoes out of engagement and urge said cam members axially toward each other, said biasing means being such that said fourth force component is greater than said first force component but less than said second or third force component, whereby:

1. with the winch operating under power to reel in cable, as in lifting a load, the shoes are engaged with the ratchet plate, so that when power is turned off, the clutch-brake assembly functions as a brake to stop cable from paying out under the force of the external load,

2. with the winch operating under power to pay out cable as in lowering a load, the shoes are in engagement with the ratchet plate, so that sliding engagement occurs with the clutch-brake assembly acting as a speed governor to prevent the drum from overrunning the power source,

3. with cable being pulled off the drum at a moderate rate of acceleration, the shoes remain disengaged to permit the paying out of cable with the ratchet plate remaining stationary, and

4. in a situation where cable is paying out at an excessive rate of acceleration, the shoes engage the stationary ratchet plate to act as a brake and stop further paying out of cable.

4,004,781

ARRANGEMENT FOR THE MANAGEMENT OF PASTURES ALONG LAND STRIPS LIMITED BY WIRE FENCES

Fernando Ramon Pereda, Dr Luis Agote 2455, Buenos Aires, Argentina

Filed Sept. 26, 1975, Ser. No. 617,259
Int. Cl.² A01K *3/00*
U.S. Cl. 256—10 **3 Claims**

1. An arrangement for rotational grazing of pastures along land strips defined by wire fences, comprising

a. a body having a passage for a wire;

b. a wire extending through said passage;

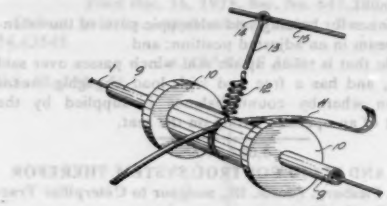
c. at least one disc-shaped member on said body, the axis of said disc-shaped member being coaxial with said passage;

d. a plurality of guiding wires defining boundaries of said land strips;

e. means for linking the ends of said first-mentioned wire with said guiding wires;

f. a supporting member on said body;

g. a resilient member having one of its ends attached to said supporting member;



h. a conductive wire parallel to said first-mentioned wire and slidably coupled to said resilient member;

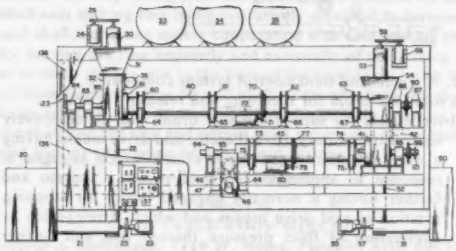
i. said conductive wire being provided at its ends with slidable attachment means having respective conductors extended on said guiding wires and connected to a voltage source.

4,004,782

MACHINE FOR MIXING AGGREGATE AND RESIN

Harvey I. Jeppsen, Mesa, Ariz., assignor to J.I.P. Industries, Inc., Los Angeles, Calif.

Filed July 7, 1975, Ser. No. 593,551
Int. Cl.² B01F *7/24*
U.S. Cl. 259—3 **9 Claims**



1. A mixing machine for mixing a particulate material with a liquid resin compound comprising:

a mixing chamber for receiving and combining said particulate material and said liquid resin compound;

a rotatably mounted mixing tube mechanically coupled to said mixing chamber for mixing and conveying said material and said compound therefrom;

a shaft having a spiral mixing screw conveyor disposed within said mixing tube;

a plurality of triangular teeth disposed along said shaft between the spirals of said spiral mixing screw conveyor; and

drive means coupled to said tube and said shaft for counter-rotation thereof to provide a turbulent mixing action which coats each particle of said material with said compound.

4,004,783

PROCESS CONTAINER

William Wilson, 716 Scott St., Stroudsburg, Pa. 18360

Division of Ser. No. 321,436, Jan. 5, 1973, abandoned. This application Feb. 3, 1975, Ser. No. 546,366
Int. Cl.² B01F *11/00, 9/00*
U.S. Cl. 259—72 **4 Claims**

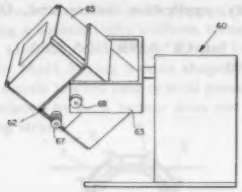
1. A process for processing material which comprises the steps of

providing a container which has a central portion for containing the material to be processed.

providing a device for supporting said container, said device comprising arms for engaging and supporting said container and means for moving said arms,

providing complementary elongated slidably interlocking fitting means on said arms and on said container, said fitting means on said container extending transversely thereof;

providing a plurality of retractable members on said arms and complementary apertures on said container for engaging said retractable members,



displacing said retractable members to their retracted position,

bringing said container into engagement with said arms so that said complementary fitting means slide into interlocking engagement and provide transverse support for said container,

returning said retractable members to their unretracted position so that they engage said complementary means to interlock said container to said arms, and

mixing the material in said container by moving said arms.

4,004,784

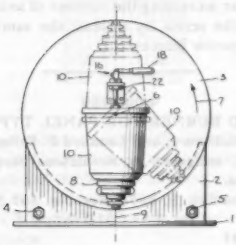
MACHINE FOR PREPARING ORTHOPEDIC CAST-MAKING MATERIALS

Edward C. Distler, Warminster, Pa., assignor to Reichhold Chemicals, Inc., White Plains, N.Y.

Continuation of Ser. No. 536,243, Dec. 24, 1974, abandoned. This application Aug. 14, 1975, Ser. No. 604,499

Int. Cl.² B01F *9/00*

U.S. Cl. 259—72 **13 Claims**



1. A machine for tilting and rotating a container comprising a first support mounted for rotation around a predetermined, horizontal axis, a second support normally facing in an upward direction for receiving said container in the upright position thereof and rotatably mounted on said first support with its axis of rotation extending transversely to said first-mentioned axis, clamping means mounted on one of said supports for securing said container to said second support for rotation therewith, and rotating means including timing means, said rotating means being connected to said first and second supports for selected sequential and intermittent rotation of said first and second supports about their respective axes, said first support being rotatable by said rotating means for repositioning said second support from facing in the upward direction to a position in which it faces in a downward direction.

4,004,785

SELF-CLEANING TYPE STIRRING APPARATUS

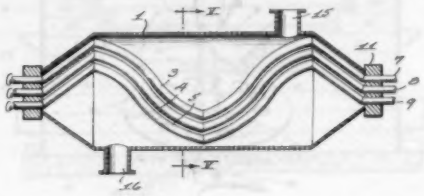
Hikokusu Kajimoto, and Takafumi Shimada, both of Hiroshima, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 11, 1973, Ser. No. 322,685

Claims priority, application Japan, Jan. 19, 1972, 47-7385

Int. Cl.² B01F *7/18, 15/06*

U.S. Cl. 259—104 **2 Claims**



1. A self-cleaning type stirring apparatus, comprising:

a container having a tubular outer peripheral wall and two opposite ends;

a corresponding plurality of rotary shafts rotatably extending into the container from the two opposite ends to provide pairs of rotary shafts, the rotary shafts at each end all having axes of rotation mutually laterally displaced from another;

a plurality of stirring members disposed within the container, the number of stirring members corresponding to the number of said pairs of rotary shafts;

each stirring member being of looping U-shape so as to include a central portion and two opposite end portions which are inclined with respect to the axes of rotation of said rotary shafts;

the opposite end portions of each stirring member being connected between the two individuals of a respective pair of said rotary shafts so that each stirring member includes a central portion which is substantially radially displaced from the axes of rotation of the rotary shafts of the respective pair to which that stirring member is connected, so that as each pair of rotary shafts is rotated once, said central portion of the respective stirring member is correspondingly revolved about the rotary axes of that pair of rotary shafts;

said stirring members including the central and two opposite end portions thereof and said rotary shafts, collectively, upon rotation of said rotary shafts, sweeping close to said peripheral wall and said two opposite ends, and sweeping close to one another along substantially the full axial extent of the interior of the container, without mutual interference, the stirring members all nesting when all extend in the same radial direction from the respective rotary shafts.

4,004,786

STIRRING DEVICE

Will R. Stephens, Cedar Rapids, Iowa, assignor to Barnard & Leas Manufacturing Co. Inc., Cedar Rapids, Iowa

Filed May 16, 1975, Ser. No. 578,104

Int. Cl.² B01F *7/00*

U.S. Cl. 259—107 **3 Claims**

1. A stirring device for mixing ingredients in a tank comprising:

(a_1) a tank,

a. a motor,

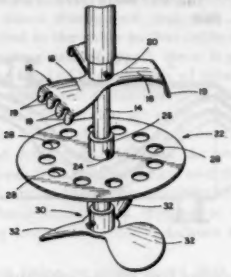
b. a shaft extending into said tank and mounted for rotational movement about a vertical axis,

c. a horizontally disposed circular shear plate mounted for rotation with said shaft, said plate having a plurality of openings for shearing ingredients forced therethrough,

d. a first prop mounted for rotation with said shaft above

and spaced from said shear plate having at least two blades pitched from the horizontal to mix and propel said ingredients downwardly toward said shear plate and having a plurality of fingers extending outwardly from the ends of the blades in a direction toward the shear plate,

e. a second prop mounted for rotation with said shaft below



and spaced from said shear plate having at least two pump blades pitched from the horizontal in the direction opposite to the pitch of the blades of the first prop to mix and propel said ingredients upwardly toward said shear plate, whereby the combined actions of the first and second props produce a vortex condition in the vicinity of the rotating shear plate for thorough mixing.

4,004,787

MIXING AND VENTING EXTRUDER

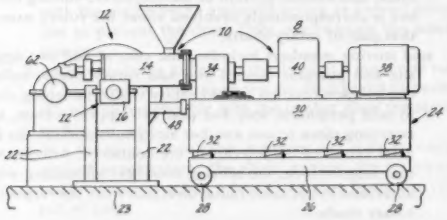
Henry Ellwood, and Maurice Rothwell, both of Greater Manchester, England, assignors to USM Corporation, Boston, Mass.

Filed Jan. 8, 1976, Ser. No. 647,511

Claims priority, application United Kingdom, Jan. 10, 1975, 1037/75; May 9, 1975, 19527/75

Int. Cl.² B29B *1/10*; **B01F** *7/08, 15/02*

U.S. Cl. 259—192 **4 Claims**



1. A screw extruding machine for homogeneously mixing and extruding a thermoplastic material, said machine comprising:

a feed hopper for feeding thermoplastic material to said machine;

at least one rotor disposed in a mixing bore of said machine for mixing said thermoplastic material fed to said machine;

an extruding screw disposed in an extruding bore of said machine, said extruding bore being in communication with said mixing bore;

a sealable vacuum chamber disposed about the rearward end of said extruding screw;

a vacuum pipe attached to said vacuum chamber permitting gaseous evacuation of said material during machine operation;

a scrap outlet disposed included with said sealable vacuum chamber; and

means for reversing said extruding screw to cause undesirable material from being extruded through said screw bore, said undesirable material being disposable through said outlet disposed within said vacuum chamber.

4,004,788

MIXING AND KNEADING MACHINE

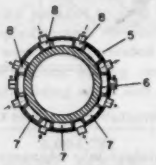
Fritz Ronner, Prattein, Switzerland, assignor to BUSS Aktiengesellschaft, Basel, Switzerland

Filed Oct. 3, 1972, Ser. No. 294,581

Claims priority, application Switzerland, Oct. 28, 1971, 15736/71

Int. Cl.² B29B *1/04, 1/06*

U.S. Cl. 259—191 **1 Claim**



1. A method of increasing the output of a mixing and kneading machine consisting essentially of a casing of fixed length; a screw shaft arranged in said casing; said screw shaft being provided with at least four mixing and kneading vanes; said casing being provided with kneading elements equal in number to said vanes and projecting radially inwardly on the inner wall of said casing; means for simultaneously rotating and reciprocating at least once per rotation said screw shaft within said casing; the method steps comprising the steps of increasing the diameter of the casing by a factor of 2 to 3 while simultaneously increasing the core diameter of said screw by an amount to maintain unchanged the difference between the casing diameter and the diameter of the screw and simultaneously reducing the screw speed by a factor of ½ to ⅓; providing a number of worm vanes and of kneading elements which is increased by a factor of 2 to 3, the increased number of vanes and kneading elements and the increases in the diameter being inversely proportional to the reduction in screw speed and further increasing the number of axial reciprocating movements of the screw by at least the same factor as the increase in the screw diameter.

4,004,789

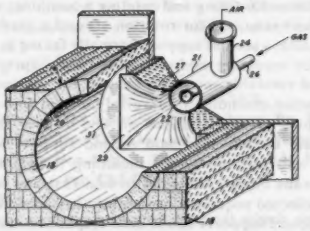
TUNNELIZED BURNER FOR PANEL TYPE FURNACE

John J. Belas, Baltimore, and Leonard P. Pellatiro, Glen Arm, both of Md., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed Feb. 5, 1975, Ser. No. 547,306

Int. Cl.² C21D *9/56*

U.S. Cl. 266—87 **8 Claims**



1. Apparatus for heating a flat continuous metallic strand of a predetermined width moving in a vertical path, comprising:

a. a plurality of heating zones, each zone consisting of a set of two panels disposed in parallel relationship and spaced from one another such as to permit the vertical movement of the strand through said heating zones between each set of panels,

b. at least one of said panels having a flat face portion adjacent the moving strand and a central passage that extends inwardly from said flat face portion through such panel, and

c. a burner having a nozzle and a burner block surrounding said nozzle, which burner is mounted at the rear of such panel in line with said central passage, said central passage having a substantially uniform transverse cross-section from said flat face portion to said burner block and said burner block having a cone shaped throat diverging from said nozzle toward said central passage, whereby the flame produced by such burner does not impinge against the moving strand.

4,004,790

PLATE-TYPE RADIATOR SUITABLE FOR SHAFT FURNACES, PARTICULARLY FOR BLAST FURNACES, AND A METHOD FOR FABRICATION OF THIS RADIATOR

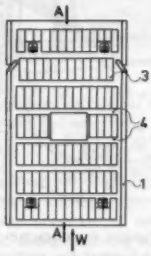
Leszek Krol; Adam Gierek, both of Katowice; Kazimierz Skoczkowski, Raciborz; Stanislaw Bednarczyk, Chorzow; Pawel Mandelka, Swietochlowice; Teodor Nowak, Bytom, and Eugeniusz Krzemien, Katowice, all of Poland, assignors to Huta Kosciuszko, Frzedsiebiorstwo Panstwowe, Chorzow, Poland

Filed Nov. 19, 1975, Ser. No. 633,382

Claims priority, application Poland, Nov. 26, 1974, 175946

Int. Cl.² C21B 7/10

U.S. Cl. 266—193 **3 Claims**



1. A plate-type radiator suitable for using in shaft furnaces and particularly in blast furnaces, said radiator having a conventional geometrical shape and including cooling pipes cast-in in a cast iron box, wherein a lining made of semi-graphite straight sections 3 is provided at the radiator side facing the interior of a furnace.

4,004,791

PRESHAPED BLAST FURNACE HEARTH CONSTRUCTION

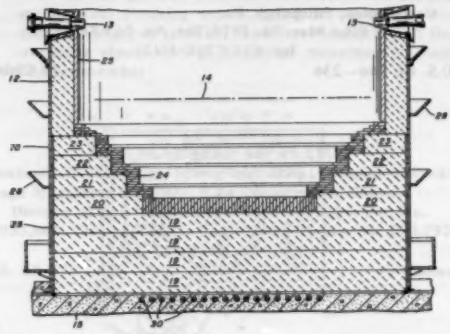
Leonard M. Saunders, Pine Township, Allegheny County, Pa., and Earl W. Sieger, Bayvillage, Ohio, assignors to United States Steel Corporation, Pittsburgh, Pa.

Filed Mar. 17, 1976, Ser. No. 667,789

Int. Cl.² C21B 7/06

U.S. Cl. 266—197 **4 Claims**

1. In a blast furnace hearth constructed of carbon blocks and having a dished upper face, the improvement in which said hearth comprises a plurality of courses of full carbon beams, and a plurality of courses of stub carbon beams overlying the uppermost course of full carbon beams, the courses of stub beams being progressively shorter from the lowermost



upwardly and extending inwardly from the hearth wall toward the center of the furnace.

4,004,792

METALLURGICAL FURNACE HAVING FLUID INJECTION MEANS FOR A MELT IN THE FURNACE

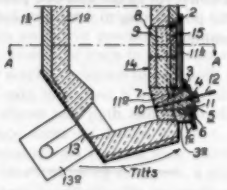
Kåre Folgerö, Vasteras, and Lars-Gunnar Norberg, Hagfors, both of Sweden, assignors to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Filed Oct. 23, 1975, Ser. No. 625,200

Claims priority, application Sweden, Oct. 29, 1974, 7413574

Int. Cl.² C21C 5/48

U.S. Cl. 266—218 **3 Claims**



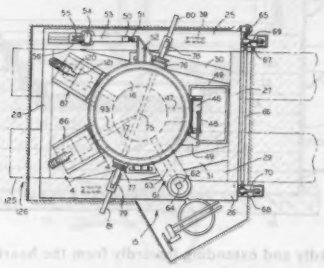
1. A metallurgical furnace comprising a vessel which tilts between substantially vertical and horizontal positions and having a refractory lining for containing a melt, said vessel having a lower portion with substantially opposite sides through which first and second openings are formed respectively, the first opening giving the melt access to an electric inductor means for receiving and heating a portion of the melt and a fluid-injection nozzle being positioned in the second opening, said vessel having a removable refractory wall portion extending upwardly from said second opening and nozzle, said wall portion, second opening and nozzle being free from the melt when said vessel is tilted to a substantially horizontal position, said second opening being formed by inwardly tapered boundary surfaces of said lining, and said removable refractory wall portion having correspondingly tapered boundary side surfaces and being formed as separable inner and outer parts with respect to the inside of said vessel, said inner part being formed by separable segments.

4,004,793

DUAL HOLDING FURNACE

Ronald D. Gray, Bethel Park, Pa., assignor to Leotromelt Corporation, Pittsburgh, Pa.

Filed Mar. 31, 1975, Ser. No. 563,843
Int. Cl.² C21C 5/42
U.S. Cl. 266—236 **12 Claims**



1. A holding furnace comprising a vessel including a refractory shell defining a first space for containing molten material,

cover means enclosing said space,

support means for supporting said vessel in an elevated position above a conveyor space,

a plurality of refractory lined pouring chambers extending from one side of said vessel in spaced apart relation, each of said chambers communicating with said first space adjacent the lower end thereof, each of said chambers having a bottom with an opening formed therein, said openings being disposed for draining molten material from said chambers into molds located beneath said vessel,

a plurality of stopper means respectively mounted for movement into and out of an opened and closed position relative to said openings,

operating means for individually operating said stopper means to selectivity open said openings for draining said molten material from said chambers and to close said openings for interrupting said draining of material,

a plurality of conveyor means disposed below said vessel and in said conveyor space and one passing beneath each chamber for positioning molds consecutively under each of said openings.

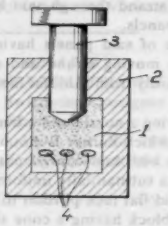
4,004,794

SPRING FORMED OF AN ELASTOMER MASS INCLUDING WATER

Jean Jarret, Fourqueux, and Jacques Jarret, Vhatou, both of France, assignors to Societe d'Exploitation des Ressorts Auto-Amortisseurs Jarret, Paris, France

Filed Apr. 5, 1973, Ser. No. 348,162
Claims priority, application France, Apr. 19, 1972, 72.13817
Int. Cl.² F16F 9/52, 1/36
U.S. Cl. 267—153 **2 Claims**

1. An improved spring of the type in which an elastomer is subjected to hydrostatic compression wherein an elastomer mass is contained in an enclosure defined by a metallic casing and by a piston mounted to a slide in a wall of the casing, the improvement characterized in that the elastomer mass comprises inclusions of water contained in at least one sealed and deformable bag.

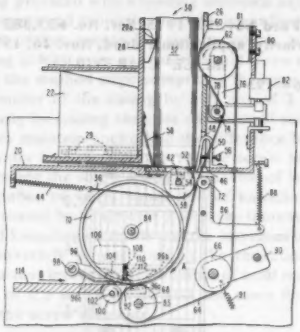


4,004,795

HOPPER MECHANISM

Mark Charles Agnew, Rochester, Minn.; James Jacob Best, Austin, Tex., and Willard Leon Gudgel, Byron, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 461,469, April 16, 1974, abandoned. This application June 12, 1975, Ser. No. 586,313
Int. Cl.² B65H 3/06, 1/12, 9/06
U.S. Cl. 271—10 **11 Claims**



5. Hopper mechanism for document cards comprising:

means forming a hopper for vertically disposed document cards in the form of a stack including a hopper base extending transversely of said document cards and supporting the document cards, means for bracing a front card of the stack, and a back shoe effective on the back card of the stack and moveable toward said bracing means,

said hopper base being provided with a throat gap through it adjacent the front card of the stack through which the front card may pass,

a pick roll positioned to move into contact with the front card of the stack as braced by said bracing means to move the card through said throat gap,

a thin flexible material strip extending across the upper surface of said hopper base for holding the bottom edges of said document cards spaced with respect to the upper surface of said hopper base, one end of said strip being attached to said back shoe, and

means for exerting a pull on the other end of said strip for thereby causing said strip to move across said hopper base along with movement of said back shoe toward said card bracing means as the cards are fed through said throat gap out of said hopper.

7. Document card transport mechanism including

moveable means for engaging with a document card and propelling it forwardly in a certain path,

a swinging registration arm positioned in said path and having a document card registration edge in said path and arranged so that a card passing forwardly in said path swings the registration arm to move the registration edge out of the path to allow the card to pass beyond said registration edge,

a roll positioned to have a peripheral surface in said path beyond said registration edge, and

means for driving said roll so that its said peripheral surface moves reversely with respect to the forward direction of movement of a document card so that the roll drives the document card backwardly after said card passes beyond said registration edge and drives the card into contact with said registration edge so as to register the card in a particular position in said path.

4,004,796

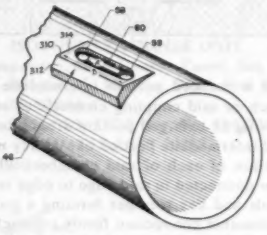
CALIPER-STITCH AND TRIM MACHINE

Thomas F. Macke, Fort Lauderdale, Fla., assignor to Hydrabind, Inc., Miami, Fla.

Continuation-in-part of Ser. No. 299,819, Oct. 24, 1972, Pat. No. 3,938,799. This application Sept. 4, 1973, Ser. No. 393,914

Int. Cl.² B65H *3/10*

U.S. Cl. 271—94 **8 Claims**



1. A sheet material separator device for moving a first sheet of material from generally flat overlying sheets of material comprising:

a base member,

a first sheet contact member including a generally flat contact surface with a leading edge, a breaking means positioned above and rearward of said leading edge of said contact surface, and a following surface, said contact member movably connected to said base member for arcuate movement into engagement with and away from the generally flat overlying sheets, said contact surface positioned forward in reference to the direction of movement of said contact member of said breaking means, said breaking means positioned forward of said following surface, said breaking means being a line forming the common boundary between said contact surface and said following surface, said following surface positioned to prevent direct contact of said following surface with the first sheet during initial movement of the first sheet after said contact surface engages the first sheet and begins separating the first sheet from the overlying sheets,

a connecting means connected in said contact surface for holding a contact portion of the first sheet of material in generally fixed engagement with said contact surface and generally over said breaking means, said connecting means being generally surrounded by said contact surface and being smaller in surface area than said contact surface,

moving means connected to and between said base member and said contact member for moving said contact member in a path to and from the generally flat overlying sheets

said following surface falling away from said breaking means in the direction opposite to the direction of movement of said contact member and toward said moving means, said breaking means aiding in separating said contact surface of said first sheet from said generally flat overlying sheets during the initial movement of said contact member.

4,004,797

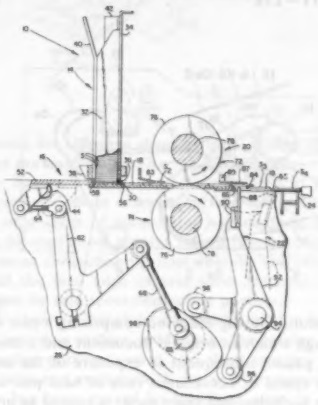
GUM SLAB FEED APPARATUS

Lawrence W. Schoppee, Springfield, Mass., assignor to Package Machinery Company, East Longmeadow, Mass.

Division of Ser. No. 463,909, April 25, 1974, Pat. No. 3,933,064. This application June 19, 1975, Ser. No. 588,152

Int. Cl.² B65H *1/06, 3/24*

U.S. Cl. 271—136 **10 Claims**



1. A gum slab feeding apparatus comprising a frame including means defining a substantially horizontal gum slab feed path having an upwardly facing slab support surface, a magazine feed mechanism including a magazine for containing a supply of gum slabs, means supporting said magazine on said frame for pivotal movement about a horizontal axis extending transversely of said path and longitudinally spaced from said magazine between an active position wherein said magazine extends upwardly from said path to maintain a supply of gum slabs in vertically stacked relation to said path and an inactive position wherein said magazine is vertically displaced a substantial distance above said path and longitudinally spaced a substantial distance from its active position, and a pusher mechanism for successively feeding gum slabs from the bottom of said magazine and along said path, a plurality of transversely spaced and longitudinally extending guide plates mounted on said frame and defining another horizontal surface above said support surface and a forwardly facing front surface extending transversely of said path, said pusher mechanism having at least one pusher finger supported for reciprocal forward and rearward movement in a space between a pair of adjacent guide plates between an advanced position and a retracted position, said one pusher finger having a forward end portion including a horizontally disposed first upper surface below the elevation of said another surface and a forwardly facing first abutment surface at its forward end, said one finger having a rear portion including a horizontally disposed second upper surface above the elevation of said other surface and a second forwardly facing abutment surface defining a junction between said forward end portion and said rear portion, and drive means for imparting reciprocal forward and rearward movement to said pusher mechanism, said magazine having a pair of transversely spaced end brackets and means providing transverse connection between said end brackets and defining front and rear walls of said magazine, said front

and rear walls being generally vertically disposed and having lower edges spaced above said other surface a distance slightly greater than the vertical dimension of a slab contained within said magazine when said magazine is in its active position, said other surface defining the bottom of said magazine when said magazine is in its active position.

4,004,798

PHOTOCOPYING MACHINE SHEET SEPARATION DEVICE

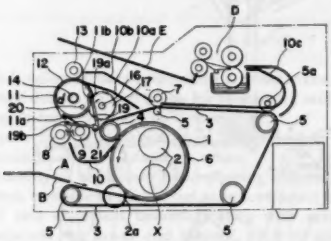
Naohiro Akisato, Toyokawa, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Mar. 31, 1976, Ser. No. 672,537

Claims priority, application Japan, Apr. 8, 1975, 50-47737[U]

Int. Cl.² B65H *29/64*

U.S. Cl. 271—172 **12 Claims**



1. In a photocopying machine comprising a pair of slippage rolls through which an original document and a sheet of copy paper are passed subsequent to exposure of the copy paper, the rotary speed of constituent rolls of said pair of slippage rolls being such that said copy paper is caused to precede said original document at least during initial passage of said original document and said copy paper through said slippage rolls so as to separate, automatically said copy paper from said original document, a sheet separation device comprising;

separator guide means including at least one plate element and a support shaft on which said plate element is freely rotatable, said plate element having a peripheral notched portion in which the leading edge portion of said copy paper is engaged so as to be guided along an orbit out of the path of the original document,

stop means which engage said separator guide means to hold said notched portion at a position to face the leading edge portion of said copy paper exiting from said slippage rolls, and, in turn, is disengaged from said separator guide means by being contacted by the leading edge portion of said copy paper,

initial drive means coupled to said separator guide means for forcibly rotating said separator guide means in a direction of disengaging said notched portion from the leading edge portion of said copy paper when said stop means is disengaged from said separator guide means, and

subsequent drive means coupled to said separator guide means for continuously rotating said separator guide means at a speed lower than the peripheral speed of said slippage rolls to the waiting position where said separator guide means is again engaged with said stop means.

4,004,799

RECONSTRUCTIBLE KARATE BOARD

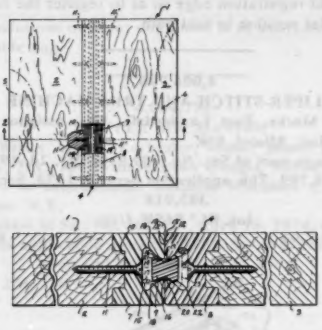
Robert L. Kundert, Madison, Wis., assignor to Focus/Board Inc., Madison, Wis.

Filed Apr. 7, 1975, Ser. No. 565,910

Int. Cl.² A63J *5/00*

U.S. Cl. 272—8 N **13 Claims**

6. A karate board comprising a pair of similar elongated similar shaped flat board members each having a thickness substantially less than its width or length and having a joinder edge, a separable replaceable connecting means for securing said board members in an edge to edge relationship, said connecting means including a pair of corresponding channel members fixedly secured one each to each edge said joinder edges, each of said channel members having flat edge faces located in abutting relation in the connected position of said board members and including a centrally located coupling channel, each of said coupling channels having an entrance neck portion defining a pair of locking projections having a limited flexibility and an inner enlarged base portion spaced inwardly of the projections, an elongated key member; said key member having at least one pair of opposed enlarged



portions and a reduced portion intermediate said enlarged portions, each of said coupling channels of said connecting means receiving an enlarged portion of said key member and said reduced intermediate portion of said key member receiving a projection of each of said chambers when said board members are connected in said edge to edge relationship said edge channels and key member forming a non-breaking deformable releasable connection firmly connecting said board members in coplanar relationship and preventing separation of the flat board members in the plane of the board members and transverse of said joinder edges and with the edge key snapping outwardly of said channel without noticable disruption of the channels and key in response to a karate force applied to the keyed board member.

4,004,800

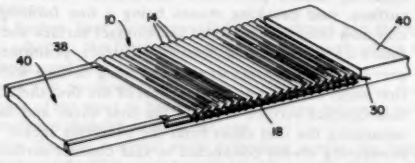
LONG JUMP MARKING BOARD

Richard E. Hanner, 8455 Laurel Lane, Loomis, Calif. 95650

Filed June 26, 1975, Ser. No. 590,657

Int. Cl.² A63K *3/04*

U.S. Cl. 272—101 **6 Claims**



1. A running long jump take-off board for indicating the initiation of a running jump comprising:

a generally elongated base member having a planar, continuous horizontally disposed upper surface;

a plurality of generally elongate longitudinally parallel, spaced flat strip elements disposed in parallel, overlying relation to and supported by said upper surface extending transverse a direction of said board and of said running jump, each of said elements having a lower elongated

edge pivotally mounted to said base member and being adapted to be individually pivoted to occupy a first upright angularly disposed position and a second substantially horizontal position, each of said elements being pivoted on said lower edge to move from said first position to said second position independently of each other, each of said elements including an upper edge disposed with respect to said lower edge, towards a point of commencement of said running jump when said elements are in said first and second positions, said second position disclosing the contact point of an athlete's foot when said elements, occupying said first position, are contacted by an athlete's foot as the jump is initiated; and

means connected to said base for returning said elements from said second position to said first position including stop means for preventing said elements to occupy a position beyond said first position.

4,004,801

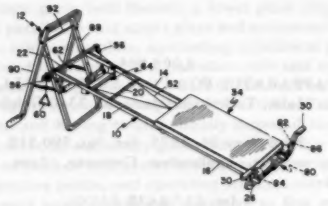
ISOTONIC EXERCISE UNIT

Thomas J. Campanaro, 6840 Convoy Court, San Diego, Calif. 92111, and Douglas E. Marino, 2023 Red Coach Lane, Encinitas, Calif. 92024

Filed June 13, 1975, Ser. No. 586,734

Int. Cl.² A63B *21/00*

U.S. Cl. 272—120 **5 Claims**



1. An exercise unit comprising:

a. a pair of parallel rails;

b. cross members mounted to and between said rails to maintain same in spaced relation;

c. a carriage having rollers engaged on said rails whereby said carriage is easily movable along the substantial length thereof;

d. means for maintaining one end of said rail pair at an elevation relative to the other end thereof;

e. a foot grip freely pivotable on the rails during an exercise operation, and said grip being positioned between said pair of rails near the elevated end thereof and having releasible strap means for retaining the feet therein;

f. said foot grip comprising a pair of generally orthogonally related cradle-forming padded plates, the first of which plates normally being disposed beneath the sole portions of the feet of the user and the second of said plates extending behind the heels of the user and substantially covering same whereby a person lying on said carriage can engage his feet in said foot grip and draw himself upward along said rails by pulling with the back of his heels against the second of said plates.

4,004,802

SHEET STRIPPING DEVICE

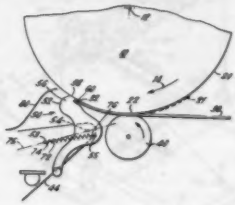
Edric R. Brooke, Welwyn Garden City, England, assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 3, 1975, Ser. No. 619,419

Claims priority, application United Kingdom, Nov. 20, 1974, 50317/74

Int. Cl.² B65H *29/54*

U.S. Cl. 271—174 **5 Claims**



1. A device for stripping sheet material from a sheet carrying surface moving relative thereto including

a finger having a sheet contacting portion at a first end adjacent said sheet carrying surface to contact the lead edge of a sheet of material on said surface, said finger being pivoted about a point spaced from and upstream of said sheet contacting portion whereby the pivot point is behind the lead edge of said sheet material when it is engaged by said sheet contacting portion;

means for biasing said sheet contacting portion toward said sheet carrying surface, said means for biasing said sheet contacting portion toward said sheet carrying surface is an over center spring which moves over center after said finger has been moved by said lead edge to a position where said lead edge is stripped from said sheet carrying surface.

4,004,803

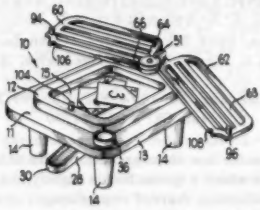
GAME APPARATUS WITH TIMER-CONTROLLED RECEPTACLE CLOSURE

Jeffrey D. Breslow, Highland Park, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.

Filed Oct. 20, 1975, Ser. No. 623,810

Int. Cl.² A63F *9/00*

U.S. Cl. 273—1 R **12 Claims**



1. A game apparatus, comprising:

a frame;

a receptacle mounted on said frame;

pivotally mounted, generally planar closure means for said receptacle and adapted to cover said receptacle;

at least one playing piece adapted to be deposited in said receptacle by a player of the game; and

timing means operatively associated with said closure means and adapted on actuation after an interval of time

to cause said closure means to cover said receptacle thereby preventing a player from depositing said playing piece in said receptacle.

4,004,804

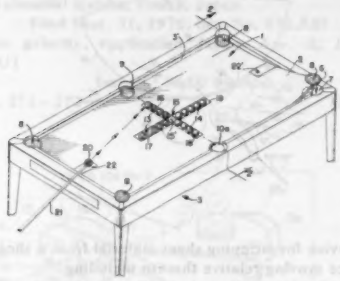
GAME APPARATUS

William T. Gholson, 9853 Ventura St., St. Louis, Mo. 63136

Filed Jan. 2, 1976, Ser. No. 646,021

Int. Cl.² A63D *15/00, 15/04*

U.S. Cl. 273—5 R **9 Claims**



1. A game apparatus including, a rectangular game top having a substantially planar upper playing surface, means supporting said game top at a fixed elevation, out-of-bounds markers at the four corners of said playing surface, a tee marker of a first color adjacent one end of said playing surface, a cue ball of said first color adapted to be spotted on said tee marker upon the initiation of play, a tee marker of a second color adjacent the opposite end of said playing surface, a cue ball of said second color adapted to be spotted on said second color tee marker, a plurality of sequentially numbered playing balls of said first color and a plurality of sequentially numbered balls of said second color disposed upon said playing surface, rack marking means in the center of said playing surface for initially spotting all of said playing balls, a side marker of said first color intermediately disposed along one side of said playing surface, a side marker of said second color intermediately disposed along the opposite side of said playing surface, and cues adapted to be used by two players each to drive one of said colored cue balls to sequentially strike said numbered playing balls of a similar color into one said side marker of a similar color.

4,004,805

ELECTRONIC LINE MONITORING SYSTEM FOR A TENNIS COURT

Kun-Mu Chen, 4608 Tacoma Blvd., Okemos, Mich. 48864, and Bertha L. Chen, 7200 Marine Drive, Alexandria, Va. 22307

Filed Aug. 30, 1974, Ser. No. 499,341

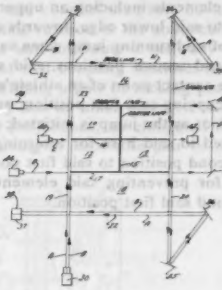
Int. Cl.² A63B *61/00*

U.S. Cl. 273—29 R **18 Claims**

1. A system for use in conjunction with a tennis court to detect shots in which a tennis ball is slightly out of bounds and provide an indication thereof comprising:

means for establishing a pair of inner and outer substantially parallel reference light beams tracing the entire outer boundary of a tennis court with said outer beam being the out-of-bounds representation point of said boundary when in use, said beams being positioned slightly above the playing surface and spaced from one another a distance such that a tennis ball will not interrupt both beams simultaneously when it strikes the boundary during play; said establishing means being a dual beam light projector and a plurality of light reflectors, at least a pair of said reflectors being positionable near at least three corners of a tennis court to direct said inner and outer beams along the boundary of a tennis court;

means for intercepting said beams after they have traced said boundary and providing signals representative of the interruption of either of said beams;



logic circuit means coupled to said intercepting means for generating a signal only when said outer beam is momentarily interrupted by a tennis ball during play; and

signalling means coupled to said logic circuit and responsive to said means generating said signal to provide an alarm indicating an out-of-bounds shot.

4,004,806

APPARATUS FOR COLLECTING BALLS

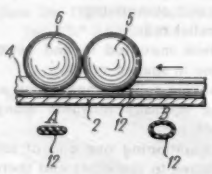
Stanislaus Malik, Taelesbahnstrasse 24, 7340 Geislingen, Germany

Filed June 26, 1975, Ser. No. 590,510

Claims priority, application Germany, June 27, 1974, 2430916

Int. Cl.² A63B *61/00*

U.S. Cl. 273—29 R **22 Claims**



1. Apparatus for collecting balls from a playing area, comprising

a. a channel surrounding at least a portion of said playing area for receiving balls rolling out of said playing area;

b. a device of relatively high weight in comparison to a ball normally used in conventional ball games, said device being capable of rolling transport in said channel;

c. means for driving said rolling device along in said channel, whereby balls received in said channel will also be driven therealong; and

d. means for collecting said driven balls.

4,004,807

TABLE BALL GAME

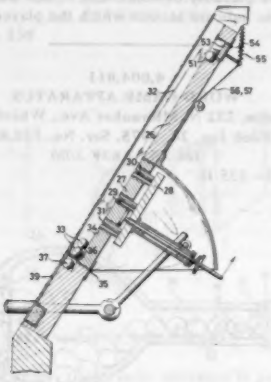
Xaver Leonhart, No. 60 1/3, Harburg b. Landau/Isar, Germany 8381

Filed Jan. 14, 1976, Ser. No. 648,950

Claims priority, application Germany, Oct. 9, 1975, 2545263

Int. Cl.² A63D 5/08; A63F 7/02; G07F 17/38

U.S. Cl. 273—41 8 Claims



1. A table ball game comprising a housing, a long rectangular playing surface connected in said housing and having a surface opening adjacent one end thereof, an upper plate positioned in said surface opening having one side pivotally connected to said playing surface and having a surface in alignment with said playing surface and which slopes downwardly towards said one end in its normal position, said upper plate having cylindrical openings therethrough disposed at right angles to said surface thereof and of a size adapted to accommodate game balls therein, a lower plate disposed beneath and parallel to said upper plate and connected to move relative to said upper plate, upstanding cylindrical pins connected to said lower plate in registration with said cylindrical openings and having free ends which in their normal position terminate approximately in alignment with the surface of said upper plate and having small centrally disposed recesses on the said free ends, stationary guide means connected on the underside of each of said plates and extending at right angles to the respective plates, and operating means connected with said stationary guide means and operative to first move said lower plate away from said upper plate and axially move said upstanding cylindrical pins downwardly in the cylindrical openings in the upper plate by a distance to accommodate a game ball therein, subsequently pivot both of said plates in the position in which they are separated from one another in a downward direction away from the playing surface about the pivot connection of the upper plate with the playing surface, and finally return both of said plates in the reverse order to the normal positions thereof.

4,004,808

SPIRAL MANIPULATIVE GAME

Jon A. Gerber, 15 Bellewood Circle, North Syracuse, N.Y. 13212

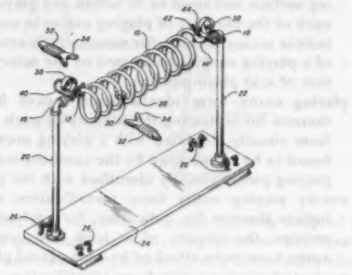
Filed Mar. 29, 1976, Ser. No. 671,274

Int. Cl.² A63F 9/00

U.S. Cl. 273—108 10 Claims

1. Spiral manipulative game apparatus comprising:
a. means defining a spiral path having terminal ends;
b. support means fixedly positioning said path-defining means with its central axis substantially horizontal;
c. a projectile movably attached to said path-defining means for free movement along said spiral path; and
d. a pair of separate elements having end portions adapted to engage and propel said projectile along said path by manual manipulation of said elements by two players.

10. A method of playing a game employing a movable projectile constrained in a spiral path along a horizontal axis, said method comprising:
a. positioning a player on each side of the horizontal axis;



b. positioning the projectile at the center of the spiral path;
c. the players attempting to move the projectile in opposite directions along the path by propelling the projectile upwardly along the path on their respective sides of the axis; and
d. continuing until the projectile reaches one end of the path.

4,004,809

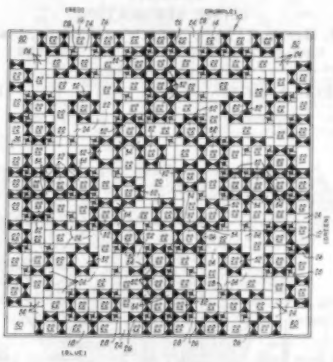
BOARD GAME APPARATUS

Gerald A. Schreiber, Bethany, Okla., assignor to Bartholomew, Limited, Bethany, Okla.

Filed May 12, 1975, Ser. No. 576,334

Int. Cl.² A63F 3/00

U.S. Cl. 273—134 C 14 Claims



1. A board game apparatus comprising:
a game board having a playing surface divided into a plurality of playing areas surrounding a center section, each playing area comprising:
a plurality of playing spaces formed on the playing surface thereof;
a plurality of blank spaces formed on the playing surface thereof and separating said playing spaces one from the other;
a plurality of passage indicia means formed on the playing surface within certain of said blank spaces for indicating passages from one playing space to another through said blank spaces; and
means thereon for visually distinguishing each said playing area from each of the other playing areas;

a plurality of playing piece sets corresponding in number to the number of playing areas, each playing piece set comprising a plurality of playing pieces each bearing means thereon for visually identifying said pieces with one of said playing areas, the plurality of pieces in each said set being so constructed and arranged to be selectively combinable to construct at least two forms of a playing entity positionable on and movable over said game board playing surface and sized to fit within any playing space, and each of the plurality of playing pieces in each set bearing indicia means thereon for visually indicating the identity of a playing entity constructed by the selective combination of said playing pieces;

playing entity form identification means having indicia thereon for indicating the identity of each playing entity form visually identified with a playing area of said game board to be constructed by the combination of said set of playing pieces visually identified with the playing area;

enemy playing entity form identification means having indicia thereon for indicating, for each of said playing entities, the identity of at least one opposing playing entity form to be attacked by each of said playing entities;

protected playing entity form identification means having indicia thereon for indicating, for each of said playing entities, the identity of at least one of the forms of each of said playing entities which is protected from attack by opposing playing entities;

playing entity movement indication means having indicia thereon for indicating, for each of said playing entities, the movement of each of said playing entities over the playing surface of said game board, and

a plurality of indicia means, corresponding in number to the number of playing areas and having means thereon for visually identifying each of said indicia means with a respective associated playing area, for moving over the playing surface of said game board between the center section of said game board and the starting and finishing spaces of the playing areas.

4,004,810

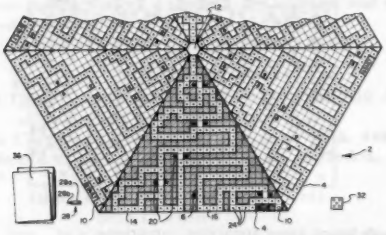
GAME APPARATUS

Darwin E. Henrie, 1194 N. 3000 West, Clinton, Utah 84015

Filed Nov. 17, 1975, Ser. No. 632,189

Int. Cl.² A63F *3/00*

U.S. Cl. 273—134 GM **15 Claims**



1. A game for at least two players comprising

a game board having a generally planar surface playing area divided into at least two segments, each for use by a different player, each segment including a pathway inscribed thereon having a starting position and a finishing position, each pathway being divided into a plurality of playing spaces over which a playing piece is moved and each having a plurality of loops which branch from the pathway at various locations therealong and rejoin the pathway or another loop at locations closer to the finishing position, each of said loops providing an alternate path around a corresponding primary portion of the pathway over which a playing piece may be moved.

a plurality of gate elements disposed on the game board playing area in each segment at a plurality of positions along each pathway, each gate element being adapted for movement between a close position, for blocking movement of a playing piece along the corresponding pathway past the element, and an open position, for allowing movement of a playing piece along the pathway past the element, and

a device usable by the players for randomly presenting any one of a plurality of numerical values which are preassigned to indicate actions which the players may take.

4,004,811

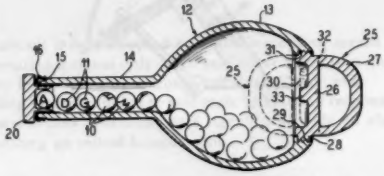
WORD GAME APPARATUS

Henry Brandin, 232 N. Milwaukee Ave., Wheeling, Ill. 60090

Filed Jan. 24, 1975, Ser. No. 543,831

Int. Cl.² A63F *3/06*

U.S. Cl. 273—135 D **4 Claims**



1. An apparatus for use in a game of luck and skill among a plurality of participants, in which word combinations are to be made from letters randomly drawn, the apparatus comprising:

a plurality of solid objects identical to one another except for each object having a letter imprinted on a surface thereof, which is different from other letters imprinted on others of said objects;

an opaque flask having a narrow neck, and containing a set of said objects and obscuring the letters thereon, from which individual objects may be selectively and randomly dispensed in a sequence;

a board on which each participant may place his lettered objects with their letters displayed; and

said flask having a handle on its outer surface opposite said neck, whereby the flask and contents may be held and agitated.

4,004,812

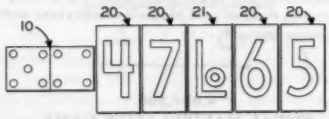
DOMINO TYPE GAME

Paul H. Lutz, 8738 21st N. W., Seattle, Wash. 99817

Filed Apr. 17, 1975, Ser. No. 568,827

Int. Cl.² A63F *9/20*

U.S. Cl. 273—137 C **13 Claims**



1. In a game, a multiplicity of substantially rectangular playing pieces, a plurality having numerical symbols visually represented thereon selected from a defined numerical range having a mid point, another piece symbolizing Hi and still another piece symbolizing Lo, said pieces being adapted to be successively positioned in side by side relation in transverse alignment in a run of alternate numerically higher and lower sequence with the piece symbolizing Lo being equivalent to pieces lower than said mid point and the piece symbolizing Hi being equivalent to pieces higher than said mid point, said

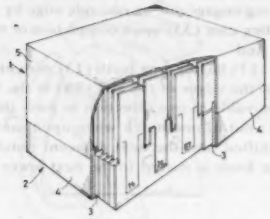
pieces being of different colors and having a pre-assigned playing value individual to their respective colors.

4,004,813

LOTTERY-TICKET ASSEMBLY

Stig Ingemar Sanden, Apelvagen 7, S-241 00, and Gertrud Marianne Sanden, Sturegatan 50, S-241 00, both of Eslov, Sweden

Filed Mar. 12, 1975, Ser. No. 557,586
Int. Cl.² G07C *15/00*
U.S. Cl. 273—139 **4 Claims**



1. A lottery ticket assembly, comprising:
a container;
a plurality of lottery ticket strips mounted in an upstanding position in said container, each lottery ticket strip including a common base portion and a plurality of upwardly projecting, spaced lottery tickets,
each of said lottery tickets comprising: a pulling portion formed from said base portion, said pulling portion being defined by spaced, generally parallel side tear-off lines and a bottom tear-off line and projecting upwardly from said base portion, and being adapted to carry a lottery ticket designation thereon; an upwardly extending tongue portion integral with said pulling portion between said side tear-off lines, and defined by a top edge, and generally parallel side edges that lie outside said parallel side tear-off lines; and frangible bridge portions on either side of said pulling portion lying between said side tear-off lines and said side edges, and connecting said tongue portion with said base portion, said bridge portions being weakened by tear-off lines extending laterally outwardly from the side tear-off lines of said pulling portion toward said side edges of said tongue portion, said laterally extending tear-off lines terminating short of said tongue portion side edges whereby said tongue portion remains integrally joined with said bridge portions and said base portion; and
spacer strips disposed in alternating relationship between the base portions of said lottery ticket strips, and adapted to hide lottery designations carried on said pulling portions.

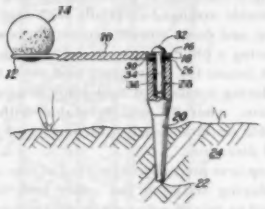
4,004,814

HORIZONTALLY SWINGABLE GOLF TEE

C. Lee Blair, Seymour, Ind., assignor to The Raymond Lee Organization, Inc., a part interest

Filed Nov. 25, 1975, Ser. No. 635,119
Int. Cl.² A63B *57/00*
U.S. Cl. 273—204 **1 Claim**

1. A golf tee comprising:
an elongated vertical wooden element having a lower pointed end and a vertical axially disposed bore extending downwardly from the upper end to a point intermediate the ends;
a metal pin having an enlarged horizontal head and a shaft extending vertically downwardly from said head, said shaft being disposed in fixed position in said bore with the head disposed above the upper end of the element;
a hollow metal tube disposed in the bore and receiving said shaft;
a first horizontal metal ring encircling the shaft below said head and above the top end of the tube in bearing relationship therewith; and
a single continuous length of metal wire, said length being bent into a second horizontal ring portion larger in diameter than the first ring with a central opening adapted to support a golf ball, the remaining portion said length being of inter-twisted strands to form a horizontally elongated arm attached to and extending radially outwardly from the second horizontal ring, said arm being attached at its radially outward end to the periphery of the first horizontal ring.

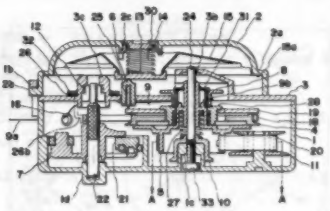


4,004,815

MINIATURE TOY SOUND-REPRODUCING DEVICE

Katsumi Watanabe, Kawasaki, Japan, assignor to Yugen Kaisha Watanabe Kenkyusho, Japan

Filed June 26, 1975, Ser. No. 590,684
Claims priority, application Japan, Mar. 6, 1975, 50-29645[U]
Int. Cl.² A63H *3/33*
U.S. Cl. 274—1 A **8 Claims**



1. A simplified device for sound reproduction comprising, in combination:
a. a casing;
b. a shaft mounted uprightly within said casing;
c. a rotor slidably mounted on said shaft, said rotor being both rotatable and movable up and down relative to said shaft;
d. biasing spring means for yieldably urging said rotor upwardly to normally hold the same in an elevated position on said shaft;
e. constant torque spring means for exerting constant torque on said rotor to cause the same to rotate in a predetermined direction;
f. means actuated manually for rotating said rotor in a direction opposite to said predetermined direction against the force of said constant torque spring means while simultaneously causing said rotor to descend from said elevated position against the force of said biasing spring means, including
1. A reel arranged coaxially with said rotor so as to be movable up and down and rotatable simultaneously therewith; and
2. a string having one end affixed to said reel and another

end led out of said casing through an eyelet positioned in the side wall of said casing, said string being adapted to be pulled manually to cause said rotor to rotate in said opposite direction and to descend from said elevated position against the force of the said biasing spring means; and

3. a spring over-hung above said record on which said string is held out of contact with said record;

g. a turntable arranged coaxially with said rotor and movable up and down simultaneously therewith, said turntable having a phonograph record thereon;

h. clutch means for connecting said rotor to said turntable only during rotation of said rotor in said predetermined direction, whereby said turntable with said record is rotatable simultaneously with said rotor in said predetermined direction;

i. a pickup arm pivotally supported at one end and having a reproducing stylus at the other end, said stylus being adapted to ride in a groove on said record on said turntable when said rotor is in said elevated position;

j. means for causing said pickup arm to return to a predetermined starting position over said record during descent of said rotor from said elevated position; and

k. a diaphragm including a contact portion which is arranged in direct contact with said pickup arm, whereby the vibrations set up in said stylus during rotation of said record in said predetermined direction are transmitted to said diaphragm to cause the same to produce audible sound.

4,004,816

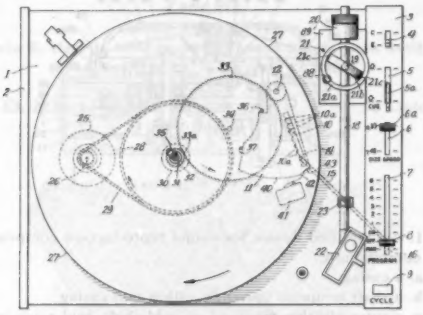
PROGRAMMER FOR RECORD PLAYER

Dwipendra Nath Guha, Huntington, N.Y., assignor to Avnet, Inc., New York, N.Y.

Filed June 6, 1974, Ser. No. 477,171

Int. Cl.² G11B 17/16

U.S. Cl. 274—10 R **9 Claims**



3. In a programmer for a record player having:

a rectangular base plate and turntable rotatably mounted on said base plate,

the combination of a record holder and feeder spindle and a cycling cam (33) for controlling the co-operation of the turntable with an eccentric pin (36) on the cam,

tone arm and record feeder spindle,

said base plate having a slot (10) inclined to a side edge of the base plate (1), one side edge of said slot having a series of notches (109) equal in number to the maximum number of records to be included in a program,

a second slot (7) in the base plate adjacent and parallel to the side edge of said base plate,

a program indicator knob (8) guided in said second slot, said first slot (10) being slightly inclined to said second indexing slot (7) and having, in cooperation with said knob, indications of the number of records which can be included in a projected program,

a program rod (15) bearing at one end a pin (14) projecting laterally into said first-named slot (10) and connected at its other end to said indicating knob,

a spring (39) connected between the base plate (1) and said pin (14) tending to retain releasably said pin (14) in any one of the notches (10a) in said slot (10), said pin (14), upon being disengaged from one notch, being drawn by the spring into engagement with the next adjacent notch, and the knob at the other end of the program rod to be shifted in its indicating slot to indicate the number of playings then remaining to be performed in sequence in a program,

a generally triangular program plate (11) pivotally mounted on pin (12) at one corner of said base plate and said plate (11) being engageable on one side edge by the pin (36) of the cycling cam (33) upon completion of the playing of a record, and

said plate (11) having cam teeth (13) matching the notches (10a) of the edges of the slot (10) in the base plate and being movable in one direction to push the program rod pin (14) out of one notch whereupon said spring biased pin is shifted into the next adjacent notch whereby the program knob is moved to the next lower indication.

4,004,817

TONE ARM ASSEMBLY IN RECORD PLAYER

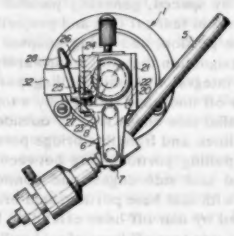
Seisuke Shimoda; Yoshiaki Shimoda, both of 20-11, Nakajujo-3-chome, Kita, Tokyo, and Harutada Shimoda, 333, Oaza Segasaki, Urawa, all of Japan

Filed July 7, 1975, Ser. No. 593,518

Claims priority, application Japan, July 4, 1974, 49-75808

Int. Cl.² G11B 3/10

U.S. Cl. 274—23 R **5 Claims**



1. A tone arm assembly for a record player, said assembly comprising:

a. a tone arm structure means including a tone arm with a pickup at one end thereof and bearing means for supporting said tone arm said bearing means having an engaging portion and a socket, said tone arm having lead wires passing therethrough connecting said socket to said pickup; and

b. supporting structure means mounted on the housing of said record player said supporting structure means including an engaging means including a dovetail groove for engaging said engaging portion of said bearing means, plug means mounted on said supporting structure means and having lead wires for connection to an amplifier when said engaging means engages said engaging portion of said bearing means, operating means including a screw means wherein the rotation of said screw means moves one side of said dovetail groove into and out of contact with said engaging portion of said bearing means whereby when said operating means moves said engaging means into engagement with said engaging portion said tone arm structure means is held in said supporting structure means and said plug means is concurrently connected to said socket means thereby enabling said pickup to be connected to said amplifier and wherein when said operating means moves said engaging means out of engagement

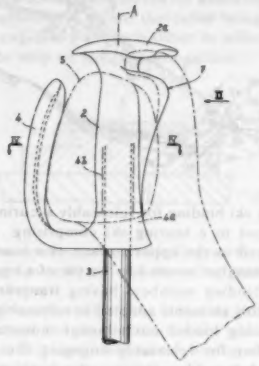
with said engaging portion said tone arm structure means is removable from said supporting structure.

4,004,818

HANDLE FOR SKI POLE

René Ramillon, 3 rue Emile-Zola, Grenoble, France

Filed July 1, 1974, Ser. No. 484,960
Claims priority, application France, July 3, 1973, 73.25311
Int. Cl.² A63C *11/22*
U.S. Cl. 280—11.37 H **3 Claims**



1. A handle for a ski pole, said handle comprising:

an elongate tubular grip body adapted to fit over the upper end of a ski pole and to fit into the hand of a user; and

an elongated resilient guard member secured to said pole only immediately below said body and extending upwardly alongside said body but spaced from the major portion of the length of said body to overlie the back of the hand gripping the body, said guard member having a free extremity turned toward but spaced from the top of said body, said member and said body being formed of an elastomer, said member including a support ring surrounding said pole immediately below said body, said body being rotatable on said pole independently of said ring to permit adjustment of the handle parts relative to each other and the ski pole during fabrication thereof, said body being thereafter fixed on said pole.

4,004,819

MOBILE TRUCK PROVIDED WITH IMPROVED REMOVABLE RACKS FOR PANS, TRAYS AND THE LIKE

Louis Joseph Brongo, Kingston, Pa., assignor to Metropolitan Wire Corporation, Wilkes-Barre, Pa.

Filed July 29, 1975, Ser. No. 599,997
Int. Cl.² B62B *5/00*
U.S. Cl. 280—79.3 **16 Claims**

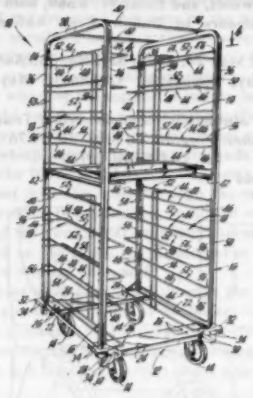
1. A device for supporting a plurality of removable pans, trays and the like thereon, said device comprising:

a base portion;

a pair of laterally spaced apart side frame sections provided with spaced apart legs secured to and extending upwardly from said base portion; and

removable racks mounted on said frame sections for supporting said pans, trays and the like on said device, said racks including support means for spacedly stacking a plurality of pans, trays and the like, one above the other between said laterally spaced apart frame sections, said racks further including retaining means cooperating with said side frame sections to provide a releaseable engagement therewith;

said retaining means of each said rack including two pairs of vertically oriented, spaced apart, associated retaining rods secured to opposite free ends of said support means, the spacing between each of said pair of said associated retaining rods being at least equal to maximum cross-sectional dimension of each associated leg of said side frame sections such that a releaseable snap engagement is created therebetween.

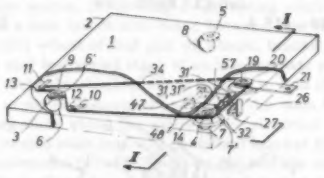


4,004,820

TRANSPORT CART

Kurt Weber, Elgg, Switzerland, assignor to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Apr. 2, 1975, Ser. No. 564,481
Claims priority, application Switzerland, Apr. 8, 1974, 4835/74
Int. Cl.² B62D *7/00*
U.S. Cl. 280—103 **12 Claims**



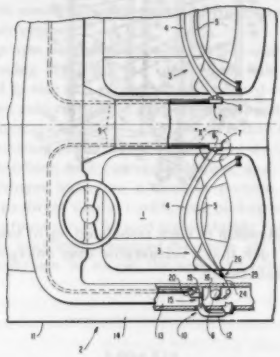
1. A transport cart comprising a plurality of support wheels including at least one freely rotatably mounted swivel wheel, a front wheel rotatably mounted on a vertical axis, and a rear wheel rotatably mounted on a vertical axis; and a steering arrangement including a pivotally mounted connecting rod, an endless belt engaging said steering gear, said rear wheel and said front wheel, a steering gear connected with said front and rear wheels for pivoting said front and rear wheels in opposite directions and means for selectively connecting said connecting rod to said steering gear and said front wheel for pivoting of said front and rear wheels in opposite directions in response to pivoting of said connecting rod whereby said rear wheel follows in the wake of said front wheel during movement of the cart.

4,004,821

DEVICE FOR THE RAPID DISENGAGEMENT OF A RETAINING SYSTEM IN VEHICLES

Werner Breitschwerdt, and Heinz W. Knoll, both of Stuttgart, Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed May 24, 1973, Ser. No. 363,565
Claims priority, application Germany, May 31, 1972, 2226389
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976
Int. Cl.[2] B60R *21/10*
U.S. Cl. 280—744 12 Claims



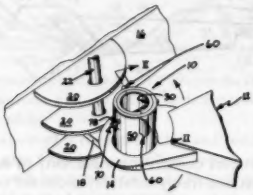
1. An installation for the rapid release of a retaining system in vehicles with a vehicle body characterized in that at least one actuating means is provided at a readily accessible place of the vehicle body which includes means enabling the initiation of a release of the retaining system from the outside of the vehicle body, and in that the actuating means cooperates with an outside door handle means which is operatively connected with a belt release means and which, upon exceeding a predetermined actuating force acting on the same, initiates an unlatching of the belt release means.

4,004,822

TRAILER HITCH ADAPTER

Harold E. Fisk, 3211 Hayes St., Marne, Mich. 49435

Filed Jan. 2, 1976, Ser. No. 645,998
Int. Cl.[2] B60D *1/14*
U.S. Cl. 280—415 A 22 Claims



1. Vehicular trailer hitch apparatus comprising cylinder means formed in at least two parts for engaging the ball member of a ball-type trailer hitch of the type having a support member from which the ball member projects outwardly, said cylinder means including internal shoulder means for engaging a surface of the ball member to prevent removal of said cylinder means from the ball member, and receiving means for receiving a hitch ring of a Lunette-eye trailer tongue thereabout; securing means engaging and holding said parts of said cylinder means on the ball member; and retaining means for retaining the hitch ring on said receiving means while allowing pivotal movement about said receiving means.

4,004,823

TOURING SKI BOOT BINDING

Ewald D. Pyzel, and Harold E. Codding, both of Reno, Nev., assignors to Ski Safe Inc., Carson City, Nev.

Filed Aug. 8, 1975, Ser. No. 602,976
Int. Cl.[2] A63C *9/10*
U.S. Cl. 280—615 6 Claims

1. A touring ski binding for releasably securing the toe of a touring ski boot to a touring ski comprising: a ski binding member secured to the upper surface of a touring ski and a boot binding member secured to the toe of a touring ski boot, each of said binding members having transversely disposed L-shaped binding elements adapted to releasably engage each other; and spring loaded latch means mounted on the ski binding member for releasably engaging the boot binding member and releasably retaining the binding members in engagement with each other;

the ski binding member having a main housing portion secured to the upper surface of the ski, a horizontally disposed transverse portion spaced a predetermined distance above the upper surface of the ski and extending rearwardly a predetermined distance from the rearward edge of the main housing portion of the ski binding member, and a vertically disposed transverse portion extending downwardly a predetermined distance at the transverse rearward edge of the horizontally disposed portion of the ski binding member, said horizontal and vertical portions of the ski binding member comprising the L-shaped binding element of said binding member;

the boot binding member having a horizontally disposed portion secured to the under surface of the ski boot at the toe end thereof and a vertically disposed portion extending upwardly along the transverse forward edge of the horizontally disposed portion of said boot binding member, said horizontal and vertical portions of the boot binding member comprising the L-shaped binding element of said binding member;

the L-shaped binding element of the ski binding member defining an L-shaped slot that is adapted to receive the L-shaped binding element of the boot binding member, and the vertically disposed portion of the boot binding member being formed with a notch that is adapted to be engaged by the spring loaded latch means mounted on the ski binding member to prevent lateral movement of said binding members relative to each other, when said binding members are in mutual engagement with each other.

4,004,824

GUIDE PLATE FOR SKI BINDINGS

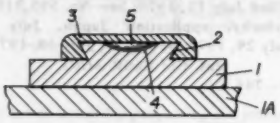
Josef Svoboda, Schwechat, Austria, assignor to Gertsch AG, Zug, Switzerland

Filed Mar. 28, 1975, Ser. No. 562,895
Claims priority, application Austria, Mar. 29, 1974, 2650/74
Int. Cl.[2] A63C *11/00*
U.S. Cl. 280—636 7 Claims

1. A guide plate assembly for use between a ski boot sole and a ski surface, comprising:

an elongated mounting plate secured to said ski surface and having first securement means integrally formed thereon and extending parallel to the longitudinal axis of said mounting plate and being exposed at the opposite ends of said mounting plate;

a monolithic guide strip made of low friction material and having second securement means integrally formed thereon and extending parallel to the longitudinal axis of said guide strip, said second securement means being initially coupled with said first securement means on said mounting plate, said guide strip thereafter being movable with respect to said mounting plate without distortion to said second securement means for assembly, said first and second securement means thereafter being cooperatively directly engaged with each other to effect a holding of said guide strip on said mounting plate;



said first securement means including an elongated first rib projecting upwardly on said mounting plate and having a dovetail shape;

said second securement means including means defining a pair of spaced and parallel second ribs which define a first recess therebetween, said recess having a dovetail cross section and receiving said first rib snugly therein, said dovetail-shaped rib and recess cooperatively holding said guide strip on said mounting plate;

wherein said first securement means includes a pair of elongated second recesses extending parallel to and on opposite sides of said first rib and having a dovetail cross section; and

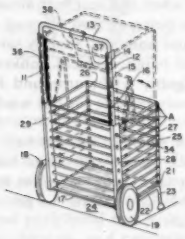
wherein said pair of parallel second ribs have a dovetail cross section and are each received in one of said elongated recesses.

4,004,825

SHOPPING CART

Alice Green, Downey, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Sept. 12, 1975, Ser. No. 612,795
Int. Cl.² B62B *11/00*
U.S. Cl. 280—654 **3 Claims**



1. A shopping cart, comprising

a substantially U-shaped frame having a pair of spaced substantially parallel sides and a head joining the sides and substantially perpendicular thereto and functioning as the handle of the cart, each of the sides having a plurality of spaced holes formed therethrough substantially parallel in direction to the head;

an axle mounted at the ends of the sides of the frame opposite the head substantially parallel to the head;

a pair of wheels rotatably mounted on the axle, each on the opposite side of a corresponding side of the frame from that facing the other side of said frame;

a pair of support members each of substantially inverted L-shape and each affixed to a corresponding one of the sides of the frame in the area of the axle, each of said support members having a first arm extending substantially perpendicularly from a side of the frame and a second arm extending at right angles to the first arm in a manner whereby the support members support the frame in upright position on a supporting surface;

a basket-type member having four corner members, each of two of which at least partially surrounds a corresponding side of the frame and has a hole passing therethrough in alignment with the holes through the side, said basket-type member being slidably mounted on the frame by virtue of the two corner members thereof being slidably mounted on the frame for movement in directions along the sides of the frame; and

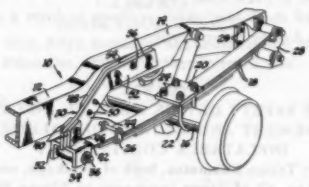
a pair of pins each positioned through the hole of a corresponding corner member of the basket-type member and through a selected hole through the corresponding side of the frame thereby releasably maintaining the basket-type member in a selected position above a surface supporting the cart.

4,004,826

LEAF SPRING SUSPENSION SYSTEM

Jayant W. Subhedar, Troy, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jan. 8, 1976, Ser. No. 647,447
Int. Cl.² B60G *11/04*
U.S. Cl. 280—718 **5 Claims**



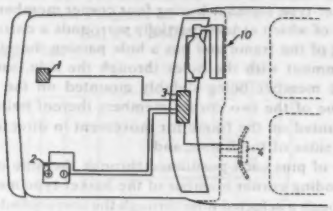
5. For use with a motor vehicle having a frame, a pair of oppositely disposed rear wheels, and a rigid axle interconnecting said oppositely disposed rear wheels, a rear leaf spring suspension system comprising a leaf spring stack extending alongside a side rail of said frame between said side rail and the adjacent wheel of said pair of wheels, bracket means for securing said leaf spring stack at an intermediate point therealong to said axle, shackle means secured to said side rail and adapted to pivotally support one end of the main leaf of said leaf spring stack about the axis of one cylindrical spring eye opening of said main leaf, and compliant bracket means operatively connected between said side rail and the other end of said main leaf, said compliant bracket means including a tunnel-shaped spring support member, pivot means connecting said other leaf spring end to said spring support member at the other cylindrical spring eye opening of said main leaf, and a laterally movable member secured at a bottom edge surface thereof to the top surface of said spring support member and at a side surface thereof to said side rail such that said laterally movable member forms a free-state predetermined laterally diverging angle with said side rail and is movable toward or away from said side rail during turning operations of said motor vehicle, as a result of the action of centrifugal force on the body of said motor vehicle and the resultant forces and/or moments applied to said rear wheels at the point of contact with the road surface, to provide an improved lateral force compliance steer of said rear wheels during said turning operations.

4,004,827

GAS BAG SAFETY APPARATUS

Yutaka Kondo, and Takashi Usugi, both of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Sept. 23, 1975, Ser. No. 615,919
Claims priority, application Japan, Apr. 8, 1975, 50-42621
Int. Cl.² B60R *21/08*
U.S. Cl. 280—742 **2 Claims**



1. A seaming method for a check valve for an inflatable knee bag to be assembled within an inflatable torso bag of a gas bag safety apparatus comprising the steps of

providing a transverse cut on the central portion of a rectangular sheet of the gas bag material;

further providing two cuts in parallel to each other respectively at each end of the transverse cut to form a pair of flaps;

folding the respective flaps outwardly to form a pair of valve portions;

further folding the sheet at the transverse center along the folded lines of the flaps to have the folded flaps to be adjacent to each other; and

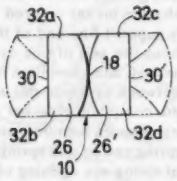
seaming all the folded sheet portions to form a valve seat portion for the valve portions.

4,004,828

VEHICLE SAFETY DEVICE USING AN INFLATABLE CONFINEMENT AND METHOD OF FOLDING THE INFLATABLE CONFINEMENT

Yoji Sogabe; Tetsuo Edamatsu, both of Ashikaga, and Takashi Oka, Tokyo, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama and Kohkoku Chemical Industry Co., Ltd., Tokyo, both of, Japan

Filed Aug. 19, 1975, Ser. No. 605,807
Claims priority, application Japan, Aug. 19, 1974, 49-94866
Int. Cl.² B60R *21/08*
U.S. Cl. 280—743 **11 Claims**



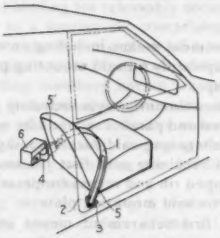
1. A safety device including an inflatable confinement which comprises substantially congruent two layers joined together along their entire edges and having a gas inlet opening formed in one layer and located in registry with a central portion of the other layer and which has a folded inoperative condition stored in a receptacle and an expanded protective condition moved out of the receptacle, the inflatable confinement in said folded inoperative condition having a generally rectangular configuration having first two diametrically opposed double-layer portions which are folded over to form respective creases substantially parallel with each other across said center portion and which have respective free ends at least in part meeting each other on said center portion, and second two diametrically opposed double-layer portions which are folded over to form respective creases substantially perpendicular to said creases formed by said first two opposed double-layer portions and which are at least in part superimposed on the first two opposed double-layer portions with the respective free ends thereof located at least in part on the outer face of said center portion.

4,004,829

PASSIVE SEAT BELT SYSTEM

Masumi Kato, Toyoake; Shigenori Kanazawa, Toyota, and Kiyomitsu Oshikawa, Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed July 11, 1975, Ser. No. 595,319
Claims priority, application Japan, July 17, 1974, 49-82608; July 29, 1974, 49-86777; July 30, 1974, 49-87852
Int. Cl.² B60R *21/02*
U.S. Cl. 280—745 **10 Claims**



1. A passive seat belt system for vehicles having at least one seat and door comprising:

seat belt means for vehicles for restraining a wearer occupying a seat,

retractor means including a reel attached to one end of said belt means for permitting said belt means to be unwound from said reel and thereby extended and for retracting said belt means by winding it around said reel for a predetermined extent,

seat belt reinforcing means, including first and second stiffeners of predetermined lengths combined with said seat belt means at opposite ends thereof, for straightening said seat belt means at said opposite ends for said predetermined lengths when the seat belt means is extended,

said first stiffener being on said one end of said belt means and being wound onto said reel by said retractor means,

said first stiffener being made of convex metal which has longitudinal rigidity when unwound from said reel but being transversely flexible for flat winding onto said reel, and

driving means for driving said seat belt reinforcing means via said convex metal strip when said vehicle door is opened so that said seat belt means is automatically unreeled to enable said wearer to get in and out of said vehicle with ease.

4,004,830

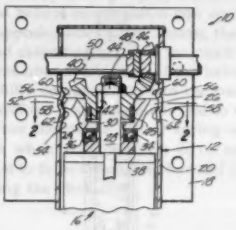
LANDING GEAR CONSTRUCTION

Jack T. Belke, Grand Rapids, Mich., assignor to Westran Corporation, Muskegon, Mich.

Filed July 25, 1975, Ser. No. 599,051
Int. Cl.² B60S *9/02*
U.S. Cl. 280—763 **4 Claims**

1. In a trailer landing gear assembly having a generally cylindrical housing and means for securing said housing to said trailer, a landing gear foot adapted to engage the ground

and an extension assembly having a gear base plate received in said housing and a downwardly depending axle adapted to be received in two registering apertures in said foot, said gear base plate having an annular flange adjacent to the inner surface of said housing, the improvement comprising vertical load supporting means formed in said housing for connecting said extension assembly to said housing and for connecting said foot to said housing, said means comprising at least two



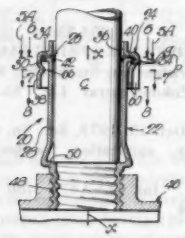
upper and two lower inwardly projecting projections integral with said housing, wherein said upper projections are positioned on said housing to abut against the upper surface of said gear base plate flange and said lower projections abut against the lower surface of said gear base plate flange whereby said cylindrical portions and said projections support the vertical load of said landing gear assembly between the extension assembly and the landing gear housing.

4,004,831

CONDUIT CONNECTORS

Gilbert R. Boutin, 14 E. Hill Road, Woodbury, Conn. 06798

Filed Mar. 1, 1976, Ser. No. 662,925
Int. Cl.² F16L *35/00*
U.S. Cl. 285—81 **11 Claims**



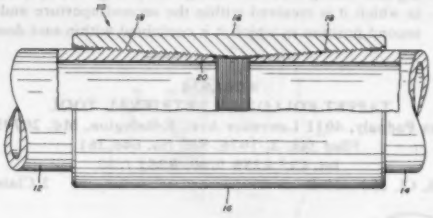
1. A conduit connector, providing a tubular body with an axis and an outwardly extending endflange with angularly spaced notches; a locking gland having a flat ring base with inward prongs thereon and being with its base normally resting on said body flange; and a cup-like cap having a bottom with a central aperture and peripheral rim with angularly spaced inner cam formations thereon, said cap being projected with its rim over said gland and body flange with its bottom aligned with said gland base, and being turnable into and from a release position in which said cam formations are aligned with said notches and said cap has freedom of axial movement into raised and lowered positions in which said cam formations are in and out of register with said notches, respectively, and said cam formations being so spaced from said cap bottom that on turning said cap in said lowered position thereof from said release position said cam formations engage said body flange and clamp the same and said gland base thereon to said cap bottom.

4,004,832

THREAD FORM FOR PIPE JOINTS

Eugene B. Connelly, Churchill Borough, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Sept. 19, 1975, Ser. No. 614,801
Int. Cl.² F16L *15/00*
U.S. Cl. 285—333 **4 Claims**



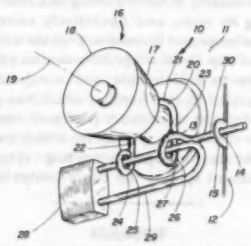
1. A threaded joint including mating male and female members having complementary cooperating threaded surfaces formed on a taper of about one and one-half inch on diameter per foot of length, said threads having crests and roots which, in profile, are arcs of circles and an intermediate flank portion of finite length connecting said crests and roots, each flank portion being tangent along opposite sides to the adjacent crests and roots and being angularly disposed with respect to perpendiculars to the axis of the joint, the angles of said flanks being symmetrical with respect to said perpendiculars and being of a magnitude less than the angle of repose of the joint materials.

4,004,833

DOOR LOCK DEVICE

Howard L. Hull, 5752 Evanston St., Indianapolis, Ind. 46220

Filed Oct. 17, 1975, Ser. No. 623,444
Int. Cl.² E05C *19/18*
U.S. Cl. 292—288 **10 Claims**



1. The combination comprising:

a door having two sides;

a door knob assembly mounted upon said door and comprising a shaft extending outwardly from one side of said door and having a horizontal axis, and a knob larger than said shaft and attached to said shaft;

a lock bolt having a first section extending downwardly on both sides of the shaft of said door knob assembly below the horizontal plane passing through the center of said shaft, and a second section extending from said first section; and

a door jamb defining a doorway, said door being hingedly mounted in said door jamb and having an open and a closed position, said door having a latching edge and the door jamb having a latching surface adjacent the latching edge of said door when said door is in the closed position; and

retaining means for engaging said lock bolt when said door

is in the closed position, said retaining means including a strike plate attached to the latching surface of said door jamb, said strike plate having a first aperture in which the second section of said lock bolt is received;

said door knob assembly including a sliding bar operable to extend from the latching edge of said door, said strike plate additionally including a second aperture for receiving said sliding bar, said sliding bar having a first position in which it is received within the second aperture and a second position in which it is contained within said door.

4,004,834

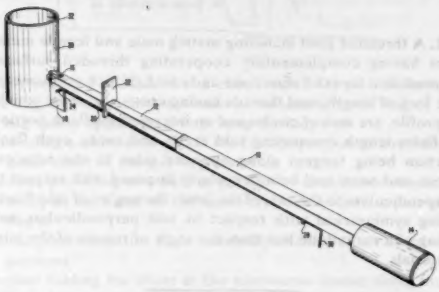
TAPPET FOLLOWER RETRIEVAL TOOL

Alex Podpaly, 4011 Lawrence Ave., Kensington, Md. 20795

Filed Jan. 2, 1976, Ser. No. 646,261

Int. Cl.² B25B *9/00*; B25J *1/00*

U.S. Cl. 294—19 R **2 Claims**



1. A retrieval tool having a long handle for remotely removing worn tappet followers from their bushings inward of the engine crankcase in which they are mounted through a camshaft bearing mount opening in the end of said crankcase,

a substantially cylindrical cup hinged at one side substantially above its bottom to the outer end of said handle, and

a control rod slidably mounted along one side of said handle and having its outer end operatively connected to said cup, and its inner end formed to provide a control grip for turning said cup on its hinge between an open position at right angles to said handle and a substantially closed position parallel to said handle, which has a closure plate extending from it over the top of said cup in its closed position so that said cup may be withdrawn safely from said crankcase through restricting clearance spaces therein, without spilling the cup's contents.

4,004,835

OVERSHOT

William T. Taylor, 222 Camp Lilly Road, Humble, Tex. 77338

Filed Sept. 15, 1975, Ser. No. 613,365

Int. Cl.² E21B *31/12*

U.S. Cl. 294—86.29 **8 Claims**

1. An overshot comprising:

a scissor-like mechanism having a pair of facing hook means which open and close toward one another to pick up a fishing neck;

a transverse pin supporting said scissor-like mechanism;

an encircling ring about the lower end of said scissor-like mechanism which, on relative movement upwardly and downwardly, limits the span of opening of said hook means;

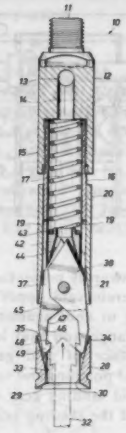
a support member connected to said pin for supporting said pin;

first means for relatively moving said ring controllably toward said scissor-like mechanism by moving either said ring or said support member, said first means causing said ring and said hook means to co-act to open and close, said first means further lowering said hook means to close by co-action with said ring when a fishing neck is engaged and the weight thereof acts downwardly thereon;

an upper body supporting said ring and said support member; and

said first means comprising

a pair of protruding and relatively movable arms pivotally mounted on said pin and comprising a portion of said scissor-like mechanism which, on movement, open or close said scissor-like mechanism;



a resilient means in said upper body bearing against said scissor-like mechanism to open the span of said scissor-like mechanism when it is not in constraining contact with said ring; and

said arms being formed with surfaces which contact and co-act with said resilient means to increase the span of opening of said scissor-like mechanism.

4,004,836

CHAIR WITH TILTABLE SPRING BIASED BACK-REST

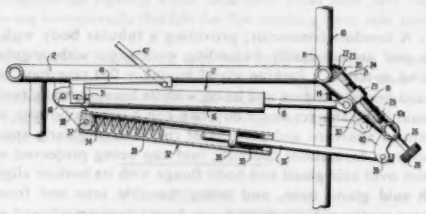
Nils Lars Ove Kristensson, Stockholm, Sweden, assignor to Landstingens Inkopscentral Lic, Ekonomisk Forening, Solna, Sweden

Filed Oct. 15, 1975, Ser. No. 622,651

Claims priority, application Sweden, Oct. 15, 1974, 7412981

Int. Cl.² A47C *3/00*

U.S. Cl. 297—354 **1 Claim**



1. A chair having a tiltable back-rest frame rotatably mounted on the chair frame about a horizontal axis and being tiltable backwards against the action of a pressure spring member mounted between the frame of the chair and a lever arm rigidly connected with the back-rest and extending downwardly relative to said horizontal axis, the lever arm comprising an adjustment screw rotatably mounted in an extended

frame member secured to the back-rest and located below said horizontal axis, a threaded sleeve mounted on the adjustment screw and connected with the spring member, the adjustment screw having a knob to enable rotation of the adjustment screw thereby to effect continuous axial displacement of the threaded sleeve along the screw, the spring member being a gas spring comprising a cylinder and a piston rod adapted to be locked in any desired position of the piston rod relative to the cylinder, a further cylinder and piston therein with a piston rod including two helical compression coil springs located in the cylinder on opposite sides of the piston, the further cylinder and piston rod extending between the chair frame and the extended frame member so that one of the helical springs will be substantially fully compressed when the backrest is in its upright position to form a stop member and to counteract the gas spring, whereas the other helical spring is substantially fully compressed when the back-rest is in its substantially horizontal position to form a stop member and to assist the gas spring when raising the back-rest.

4,004,837

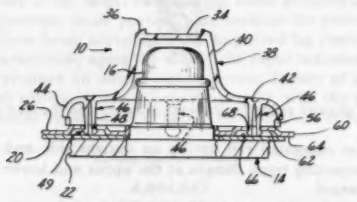
WHEEL COVER WITH SNAP ON FASTENER

John A. Main, Plymouth, Mich., assignor to Motor Wheel Corporation, Lansing, Mich.

Filed Dec. 8, 1975, Ser. No. 638,814

Int. Cl.² B60B *7/02*

U.S. Cl. 301—37 P **16 Claims**



1. A removable hub cap for a vehicle wheel having a rim and a disk fixed thereto which has a plurality of prong receiving holes disposed in the mounting hole circle area thereof and each arranged to provide a space having a predetermined axial dimension between the inner margin of each prong receiving hole and the surface on which the disk bears when mounted on a vehicle, said removable hub cap comprising; a cap body constructed and arranged to overlie both the prong receiving holes and mounting holes in the disk and to be removable from the disk, a plurality of prongs carried by said body and extending generally axially from one face thereof with the free end of each of said prongs being adapted to pass through one of the prong receiving holes, and cam means on each of said prongs adjacent the free end thereof constructed and arranged to engage said inner margin of one of said prong receiving holes and urge the free end of its associated prong into firm engagement with the surface on which the disk bears when mounted on a vehicle, whereby said removable hub cap is releasably secured and tightly retained on the vehicle wheel when said prongs are inserted in said prong receiving holes with their associated cam means firmly engaging the inner margins of said prong receiving holes and urging the free ends of said prongs into engagement with the surface on which the disk bears when mounted on a vehicle.

4,004,838

VEHICLE HUB ASSEMBLY

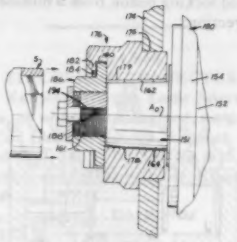
Donald D. Savage, Huntsville, Ala., assignor to B. J. Powell, Atlanta, Ga., a part interest

Division of Ser. No. 439,736, Feb. 5, 1974, Pat. No. 3,907,053.

This application Sept. 23, 1975, Ser. No. 616,068

Int. Cl.² B60B *27/06*

U.S. Cl. 301—105 R **1 Claim**



1. A hub construction for attaching a wheel to a drive shaft having a support portion and a threaded engagement portion comprising:

a hub carrying the wheel defining a central passage therethrough adapted to be received on the support portion of the drive shaft to support the wheel on the drive shaft, a semicircular recess oriented generally normal to said passage at one end of said passage of a first diameter larger than the diameter of said passage, an access opening through said hub to said recess of a width substantially equal to said first diameter; said hub further including an annular flange adjacent said recess opposite said passage and defining an inside opening smaller in diameter than said first diameter, larger in diameter than the diameter of said passage, and concentrically arranged with respect to said passage, said annular flange further defining a cutout therethrough communicating with said access opening with a width less than the width of said access opening, said cutout centered with respect to said access opening; and,

a hub nut internally threaded to engage the threaded engagement portion of the drive shaft, said nut including a circular flange at one end thereof adapted to be received in said semicircular recess through said access opening and restrained against movement axially away from said passage by said annular flange, and a smaller diameter wrenching portion receivable through said cutout into said inside opening.

4,004,839

DUAL CIRCUIT BRAKE FORCE REGULATING DEVICE

Jochen Burgdorf, Offenbach, Germany, assignor to ITT Industries, Inc., New York, N.Y.

Filed Feb. 6, 1976, Ser. No. 655,915

Claims priority, application Germany, Feb. 25, 1975, 2507997

Int. Cl.² B60T *8/26*

U.S. Cl. 303—6 C **10 Claims**

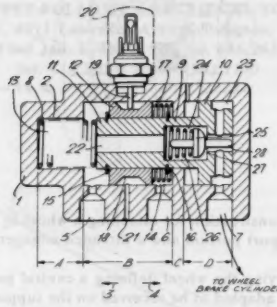
1. A brake force regulator for a dual circuit brake system having a housing including:

an axially displaceable stepped piston for closing a fluid connection through said housing between a first brake circuit and at least one wheel brake cylinder which is acted on by the pressure in said first brake circuit and by a control force, both of which act on said stepped piston in the opening direction and wherein said stepped piston is acted on in the closing direction by the pressure supplied to the wheel brake cylinder;

an axially displaceable locking piston carried in a sealed, sliding relationship by said stepped piston within and in a

sealed sliding association with said housing, said housing including a control chamber containing pressure fluid which acts on the locking piston in the opening direction being supplied by the uncontrolled pressure in said first brake circuit and an annular chamber for pressure fluid which acts on said locking piston in the closing direction being supplied by the pressure in said second brake circuit;

means on said stepped piston for limiting the axial displaceability of said locking piston from a middle position in the opening direction;



said locking piston's exterior surface having an annular recess formed from an intermediate mid-section and two ramp portions on either side thereof; and

a pressure differential warning switch associated with said housing having a tripping pin positioned through said housing to engage the mid-section of said locking piston in a radial direction when said locking piston is in its normal position on said stepped piston and to cause actuation of said tripping pin when said locking piston is displaced in either the opening direction or in the closing direction because of the failure of pressure in one of said brake circuits.

4,004,840

BEARING CAGE

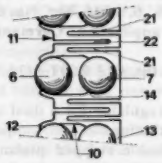
Gordon Boyd Johnston, Beesd, Netherlands, and Hasse Eivind Strandberg, Floda, Sweden, assignors to SKF Industrial Trading and Development Company, B.V., Nieuwegein, Netherlands

Filed Jan. 31, 1975, Ser. No. 545,893

Claims priority, application Netherlands, Feb. 6, 1974, 7401604

Int. Cl.² F16C *33/46*

U.S. Cl. 308—201 **4 Claims**



1. In a bearing having an inner race ring and an outer race ring, two rows of rolling elements positioned to roll between said rings in raceways in said rings and thereby to define two axially-spaced planes, with the rolling elements in the two rows being positioned to form pairs of axially aligned rolling elements, and a generally cylindrical bearing cage insertible axially from one side of the bearing and having holding means for holding separate said pairs of rolling elements and circumferentially separating each pair of axially aligned rolling elements from the adjacent pairs of rolling elements, the improvement wherein said bearing cage comprises a plurality of partitions, means connecting said partitions with an axially-extending recess defined between each two adjacent partitions, said cage being elastically compressible in the radial direction of said bearing, whereby during loading of said rolling elements in said raceway are moveable relative to each other, said cage further comprising two axially-extending, diverging snap-fingers on each of said partitions for defining said holding means, said partitions having radially extending apertures between the planes of the two rows of rolling elements, wherein said apertures comprise a first slot extending axially in each partition from one axial end thereof, and a second slot extending axially in each of said partitions from the other axial end of said bearing cage and circumferentially overlapping said first slot in a region of said partitions between said planes.

4,004,841

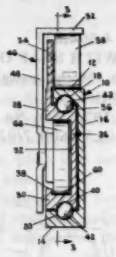
FULL EXTENSION DRAWER GUIDE

Robert J. Vander Ley, Jenison, Mich., assignor to Leslie Metal Arts Company, Inc., Grand Rapids, Mich.

Filed June 12, 1975, Ser. No. 586,209

Int. Cl.² A47B *88/00*; F16C *21/00*

U.S. Cl. 312—342 **7 Claims**



1. A drawer guide for cabinet drawers and the like comprising:

a first elongated rail having an upright side and laterally projecting track flanges at the upper and lower portions thereof.

a second rail having an elongated indented portion formed of upper and lower laterally projecting track flanges joined by an upright side portion with the indented portion of the second rail nesting closely within the first rail so that the sides of the first rail and the second rail are closely adjacent to one another;

roller bearing means between the upper track flanges of the first and second rails and between the lower track flanges of the first and second rails so that the second rail slides freely with respect to the first rail;

a roller flange projecting vertically from the outer edge of a second rail track flange past one of said first rail track flanges;

a friction roller rotatably mounted on said roller flange so that said roller rolls in contact with a surface of a first rail track flange;

a third elongated rail having an upright side portion and a laterally extending track flange, said side portion being juxtaposed to said second rail and said second track flange extending laterally over and in contact with said friction roller;

guide roller means mounted on said upright side portion of said third rail, sized to fit and positioned within said second rail between the upper and lower track flanges thereof so that the third rail glides with respect to said second rail;

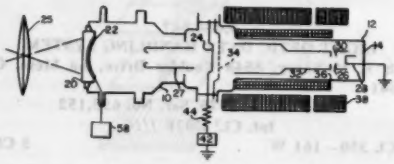
whereby as said first rail is moved with respect to said third rail, said friction roller moves said second rail one-half the distance of the first rail with respect to the third rail.

4,004,842

METHOD OF PROVIDING A SILICON DIODE ARRAY TARGET WITH IMPROVED BEAM ACCEPTANCE AND LAG CHARACTERISTIC

Walter J. Whitson; Alfred B. Laponsky, both of Horseheads, and Raymond J. Malanoski, Waverly, all of N.Y., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 5, 1975, Ser. No. 610,710
Int. Cl.² H01J *9/233*
U.S. Cl. 316—1 **1 Claim**



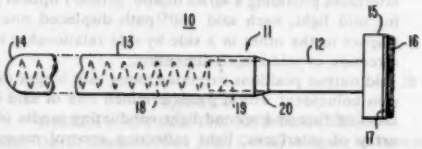
1. A method of producing an electron tube of the pick-up type having a photoemissive input portion, a generally planar diode array target portion, with photoelectrons from the photoemissive input portion being collected on the input side of the diode array target, and electronic scanning means spaced from the output side of the target for maintaining a reverse bias potential across the individual diodes of the array, and where the diode array target portion includes enlarged high surface area metal contact caps extending from individual diode portions on the output side of target, and wherein a thin layer of high resistivity material is disposed over the output side surface of the target covering the diode portions and the surface between diode portions, the method for providing a high electron beam acceptance and improved lag characteristic by operationally aging the target with input radiation sufficient to produce an output signal current density of at least about 300 nanoamps per square centimeter, with the reverse bias potential maintained at about 7.5 volts, for at least 50 hours.

4,004,843

PROBE PIN

Robert A. Boenning, Timonium, and George R. Welden, Cockeysville, both of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 25, 1975, Ser. No. 616,710
Int. Cl.² H01R *13/00*
U.S. Cl. 339—108 TP **8 Claims**



1. A probe pin for contacting electrically at one end a metallic mass having an irregular surface, comprising an elongated metallic shank, a single piece of electrically conductive resilient deformable synthetic resin affixed conductively to one end of the shank, whereby the piece provides a low resistance area contact with the irregular surface when the shank is urged axially in slight pressure engagement with the irregular surface.

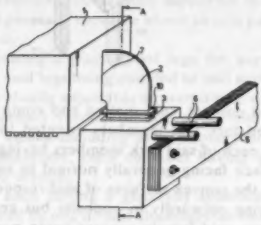
7. A probe pin for contacting electrically an irregular metallic conductive surface, comprising a spring loaded telescopic shank, and a single piece of electrically conductive resilient deformable synthetic resin affixedly positioned conductively to one end of the shank, said piece being deformable in response to pressure engagement of the piece against an irregularly contoured surface sufficient to compress the spring loaded shank, whereby an electrically conductive low resistance area contact is made between the probe pin and the irregular metallic surface.

4,004,844

ELECTRICAL CONNECTOR

Arthur George Knapton; Gordon Leslie Selman, and Stephen Lionel Pearce, all of London, England, assignors to Johnson Matthey & Co., Limited, London, England

Filed Sept. 19, 1975, Ser. No. 615,089
Claims priority, application United Kingdom, Sept. 25, 1974, 41687/74
Int. Cl.² H01R *3/04*
U.S. Cl. 339—118 R **14 Claims**



1. Apparatus comprising a container suitable for holding molten glass at high temperature and an electrical connection for connecting the container to a source of electric current, the connection comprising a metal reservoir in mechanically rigid contact with a current supplying busbar, said reservoir containing electrically conducting material which is liquid at temperatures of operation and a current carrying conductor electrically connected to said container and dipping into the electrically conducting liquid to establish electrical contact therewith and mounted for continuous electrical contact with the electrically conducting liquid during movement of the said container relative to said reservoir caused in use by thermal expansion and contraction of the container and the contents thereof.

4,004,845

HIGH DENSITY ELECTRICAL CONNECTOR EMPLOYING MALE BLADE WITH OFFSET PORTIONS

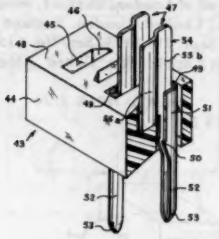
Jerzy R. Sochor, Manhattan Beach, Calif., assignor to Elco Corporation

Filed Apr. 17, 1975, Ser. No. 569,100
Int. Cl.² H01R *13/12*
U.S. Cl. 339—258 P **10 Claims**

1. A connector comprising mating male and female halves, said male half comprising an insulator housing, a plurality of contacts mounted in a row having a given direction in said housing, said contacts having an elongated configuration, one end of each contact constituting a mating end, the rest of each contact comprising means for securely mounting said contact in said housing and effecting a tail connection with said contact, said mating end comprising a blade portion protruding from a portion of said insulating housing in a direction of mating, said blade portion being generally straight in said direction of mating and comprising a first generally flat part oriented generally parallel to said direction of mating and generally normal to said given direction of said row, a second generally flat

part oriented generally parallel to but spaced from the plane of said first generally flat part, and an interconnecting part being substantially narrower in width than said first and second generally flat parts, and integrally joining said first and second generally flat parts such that said blade has a general step-like configuration when viewed in the direction of mating,

said female half comprising an insulating housing, a plurality of female contacts mounted in said housing, said contacts having an elongated configuration, one end of each contact consitituting a mating end, the rest of each contact comprising means for securely mounting said contact in said housing and effecting a tail connection



with said contact, said mating end comprising a pair of elongated fork tine members oriented in a direction of mating, each of said fork members having a convex mating surface facing generally normal to said direction of mating, the convex surfaces of said respective tine members facing outwardly in opposite but generally parallel directions, said female contact being positioned in said insulating housing to mate with respective ones of said male contacts when said male and female halves are brought together, said fork tine members of each of said female contacts being shaped and spaced such that the convex surfaces thereof will press against respectively opposite sides of the blade portion of its corresponding male contact when mated therewith.

4,004,846

ELECTRICAL TERMINAL

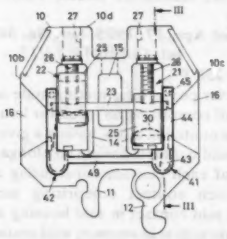
Hans Woertz, Basel, Switzerland, assignor to Oskar Woertz, Inhaber Hans Woertz, Basel, Switzerland

Filed Mar. 12, 1976, Ser. No. 666,477

Claims priority, application Switzerland, Mar. 25, 1975, 3759/75

Int. Cl.² H01R 9/10

U.S. Cl. 339—263 R **10 Claims**



10. An electrical terminal comprising a housing, at least one clamping device supported in the housing for fixedly clamping at least one electrical conductor, said clamping device comprising a stationary contact element and a clamping body provided with an opening for the reception of said at least one conductor, the contact element extending into the opening of the clamping body, a blocking flap provided at the opening of the clamping body for preventing the mistaken introduction of a conductor externally of the clamping body into the housing, at least one insert element arranged at the insulating housing, said insert element forming a pocket for the reception of the blocking flap.

4,004,847

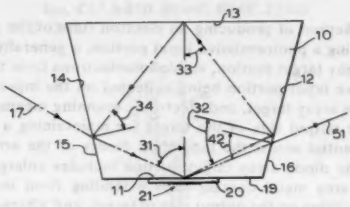
LIGHT OPTIC DATA HANDLING SYSTEM

Joseph T. McNaney, 8548 Boulder Drive, La Mesa, Calif. 92041

Filed Feb. 4, 1976, Ser. No. 655,152

Int. Cl.² G02F 1/16

U.S. Cl. 350—161 W **5 Claims**



1. Light beam distributor means, comprising:

a. a light admitting surface;

b. a source of light and means for directing light therefrom along an input path toward said admitting surface and thereupon along a primary optical path while undergoing a series of light reflections within said distributor means so as to establish an availability of light from said source at a plurality of predetermined light output positions of said distributor means for an optically controlled redirecting of light along a selected one of a plurality of secondary optical paths stemming from said output positions;

c. said means for directing light along said primary path including an array of light reflecting interfaces of first and second light conducting media presenting, respectively, first and second indices of refraction, each of said interfaces presenting a length dimension and each angularly oriented so as to establish an optical relationship one with respect of the other, with respect to said input path, and with respect to said secondary optical path, said array of interfaces providing a series of 360° primary optical paths for said light, each said 360° path displaced one with respect to the other in a side-by-side relationship in the direction of said length dimension:

d. said output positions extended along said length dimension coincident with a predetermined one of said interfaces of first and second light conducting media of said array of interfaces, light reflection control means extended along said length dimension adjacent an interface of first and second light conducting media preceding said one interface for effecting, selectively, a redirecting of light along a path away from said primary optical path toward an output position of said one interface so as to establish an angle of incidence of said light thereon for frustrating a reflection of said light therefrom and thereby allowing a passing of light along a secondary path stemming from said output position.

4,004,848

LIQUID CRYSTAL DISPLAY DEVICE

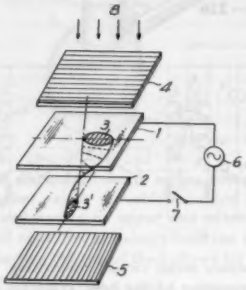
Yoshio Yamazaki, Shimosuwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Japan

Filed Mar. 13, 1974, Ser. No. 450,954

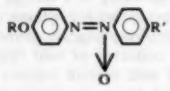
Claims priority, application Japan, Mar. 13, 1973, 48-28507

Int. Cl.² C09K 3/34; G02F 1/13

U.S. Cl. 350—160 LC 8 Claims

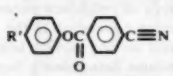


1. A liquid crystal display device, comprising opposing electrode plates unidirectionally rubbed on the facing surfaces thereof, the rubbing directions being at right angles to each other, polarizer and analyzer plates at the exterior surfaces of said opposing electrode plates and a nematic liquid crystal composition having a positive dielectric anisotropy between said electrode plates, said composition consisting essentially of at least one compound having the formula



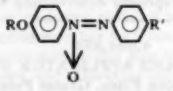
I

and at least one compound having the formula



II

where R' is a normal alkyl group having 1 – 8 carbon atoms, R is selected from the group consisting of normal alkyl groups having 1 – 8 carbon atoms and normal saturated acyl groups having 1 – 9 carbon atoms, the formula I is considered equivalent to



III

4,004,849

DISPLAY APPARATUS AND PROCESS

Meredith David Shattuck, San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 8, 1975, Ser. No. 638,398

Int. Cl.² G02B 5/23

U.S. Cl. 350—160 R 10 Claims

1. An apparatus for displaying a visible image, said apparatus comprising two substantially parallel planar electrodes at least one of which is transparent, and, contained between said electrodes, a solution in liquid of at least two polymers, at least one of which is selected from the group consisting of cellulose nitrate, polyester, polyvinylcarbazole and formaldehyde condensation polymers with the other polymer being selected from the group consisting of polymethylene-N-ethyl carbazole polymer, 3-vinyl-10-methyl phenothiazine polymer, styrene copolymerized with 2-vinyl pyridine, dibenzothiophene condensation polymer with formaldehyde, 1-vinyl naphthalene polymer, formaldehyde condensation polymer with dibenzothiophene and dibenzofuran, polyvinylcarbazole, polyester and polystyrene, and with the liquid being selected from the group consisting of tetrahydrofuran, methyl ethyl ketone, acetone, dimethyl formamide and mixtures thereof.

4,004,850

MIRROR APPARATUS

Arlan L. Nelson, N79 W16188 Community Drive, Menomonee Falls, Wis. 53051

Filed Sept. 22, 1975, Ser. No. 615,381

Int. Cl.² G02B 5/08; A47F 7/14

U.S. Cl. 350—299 4 Claims

1. Apparatus comprising:

a support rod;

bracket means slidably mounted on said support rod;

at least two mirrors articulatingly supported in said bracket means and pivotally movable about an axis parallel to said support rod;

means comprising a plurality of legs for supporting said apparatus, said legs being coupled to said support rod and being individually adjustable to permit said support rod to remain relatively vertical on uneven terrain;

said bracket means including at least one pair of opposed spherical chambers, each chamber having an elongated slot formed therein;

said mirrors each having a generally spherical protruberance received by one of said chambers for being articulatingly supported in said bracket means;

said bracket means having a generally vertical aperture for receiving said support rod;

means for deforming said bracket aperture to increase the friction between said aperture and said support rod;

said means for supporting said apparatus comprising block means having a plurality of apertures and a generally tubular leg slidably received in each aperture, each leg frictionally contacting said aperture;

said block means having a central aperture for receiving said support rod; and

each of said plurality of apertures extending at an acute angle relative to a horizontal plane and having a generally circular opening on one side of said block tapering to a generally elliptical opening on the opposite side of said block, said legs being pivotable within said aperture between a first position and a second position, said legs being freely slidable relative to said block in said first position, and frictionally fixed in said block in said second position.

4,004,851

OPTICAL DEVICE WITH MEANS FOR REDUCING INTERNAL REFLECTIONS

Hirokazu Negishi, No. 1-23, Honmoku-cho, Naka-Ku Yokohama Kanagawa, and Kazuya Matsumoto, No. 1-88, Tamagawa Okusawa Setagaya, Tokyo, both of Japan

Continuation of Ser. No. 78,179, Oct. 5, 1970, abandoned, which is a continuation of Ser. No. 837,964, March 19, 1969, abandoned, which is a continuation-in-part of Ser. No. 573,097, Aug. 17, 1966, abandoned. This application Oct. 10, 1972, Ser. No. 296,304

Claims priority, application Japan, Aug. 24, 1965, 41-4051582; Aug. 24, 1965, 41-4051583

Int. Cl. G02b 5/22; B32b 17/06

U.S. Cl. 350—311 3 Claims

1. An optical device comprising a transparent optical mass having an outer surface, internal reflection suppressing coating having an index of refraction smaller than that of said

optical mass and coated directly on said surface for suppressing internal reflections of light passing through said mass at angles of incidence to said surface greater than the critical angle, said internal reflection suppressing coating including a dispersing medium and a material in the form of light absorb-

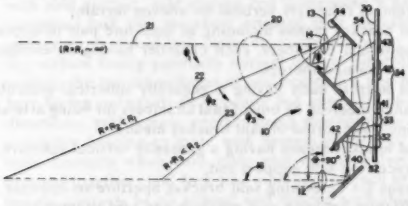
ing particles having dimensions smaller than one-fifth of the wavelength of visible light dispersed in said medium and having a sufficient density near the surface to absorb a major portion of visible light at all wavelengths incident upon the surface through the mass at angles of incidence greater than the critical angle.

4,004,852

INTEGRATED AUTOMATIC RANGING DEVICE FOR OPTICAL INSTRUMENTS

Eugene E. Pentecost, Anaheim, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed June 30, 1975, Ser. No. 591,578
Int. Cl.² G01C 3/00; G03B 7/08
U.S. Cl. 356—1 **11 Claims**



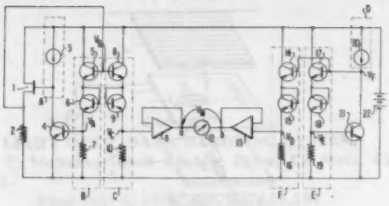
1. An automatic range determination system comprising:
image sensing means for sensing an image focused thereon;
optical means for focusing first and second images of an object the range of which is to be determined onto said image sensing means, said first and second images derived along different sightlines;
quantization means for quantizing the data generated for each image element by said image sensing means;
storage means for receiving and storing the quantized image data corresponding to said first and second images;
comparison means for comparing on an element by element basis the stored quantized image data corresponding to said first image to the stored quantized image data corresponding to said second image and providing an output which is representative of the degree of similarity between the stored quantized image data for corresponding elements of the first and second images;
control means for controlling operations performed during range determination sequences and for causing the comparator means to compare during a range determination sequence the stored data with respect to M successive elements of the first image in separate comparison sequences with the stored data for a plurality of different sets of M successive elements of said second image;
alignment storage means for storing the relative alignment between the elements of the first image and the elements of the second image which yields an optimum comparison between the stored data;
comparison optimization means for recognizing the alignment between the elements of said first image and said second image which, for the optimization criterion utilized, yields an optimum comparison between the elements of the first image and the elements of the second image.

4,004,853

EXPOSURE METER CIRCUIT

Chiharu Mori, and Masahiro Kawasaki, both of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 3, 1975, Ser. No. 610,506
Claims priority, application Japan, Sept. 3, 1974, 49-101164
Int. Cl.² G01J 1/44
U.S. Cl. 356—226 **20 Claims**



1. An exposure meter circuit comprising:
a. a first transistor having base, collector and emitter electrodes, the emitter of said first transistor being connected to a source of reference potential;
b. a first current source connected to the collector of said first transistor; and first current source comprising a photovoltaic device such as a photodiode corresponding to a first exposure determining factor;
c. a first emitter-follower circuit connected between the collector and base of said first transistor to form a feed back circuit, the emitter current of said first emitter-follower circuit corresponding to a second exposure determining factor and providing logarithmic compression;
d. a second emitter-follower circuit connected to receive the output at the collector of said first transistor, the emitter current of said second emitter-follower corresponding to a third exposure determining factor and providing logarithmic compression;
e. a second transistor having base, collector and emitter electrodes, the emitter of said second transistor being connected to a source of reference potential;
f. a second current source connected to the collector of said second transistor, said second current source corresponding to a fourth exposure determining factor;
g. a third emitter-follower circuit connected between the collector and base of said second transistor to form a feed back circuit, the emitter of said third emitter-follower circuit corresponding to a fifth exposure determining factor and providing logarithmic compression; and
h. indicating means connected between the output of said second-emitter-follower circuit and the output from the collector of said second transistor for providing an indication of a desired exposure determining factor.

4,004,854

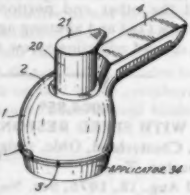
DISPENSER AND APPLICATOR DEVICE

Carl Breer, II, 45 Preston Place, Grosse Pointe Farms, Mich. 48236

Filed June 10, 1975, Ser. No. 585,525
Int. Cl.² B43K 5/00; B67D 5/06, 37/00; A47G 19/14
U.S. Cl. 401—205 **4 Claims**

1. A dispenser and applicator device for selectively dispensing and applying material to a selected area, said dispenser and applicator device comprising
a manually supported housing of substantially hemispherical bowl-type configuration having a substantially round spherical top and a substantially planar bottom, and a substantially elongated handle extending from the housing in the area of the top thereof, essentially tangentially with the top of the housing;
a storage area in the housing for storing material, the storage area having an opening at the bottom of the housing;

manually controlled dispenser control means in the housing and extending therefrom for manually selectively controlling the dispensing of material from the storage area; and a bellows having a top, a bottom, and a liquid to be dispensed therein and bellows valve means in the bottom of the bellows for dispensing the liquid therefrom under



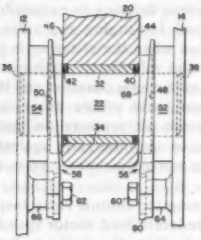
pressure, said dispenser control means comprising a piston-type member axially movably mounted in the top of the housing and having an upper end extending beyond the housing in operative proximity with the handle and a lower end abutting the top of the bellows for transmitting manual pressure thereto.

4,004,855

ARTICULATED JOINT INCLUDING SEALS MAINTAINED BY WEDGE

Gary Lee Stecklein, Dubuque, Iowa, assignor to Deere & Company, Moline, Ill.

Filed May 21, 1976, Ser. No. 688,674
Int. Cl.² F16C 11/00
U.S. Cl. 403—158 10 Claims



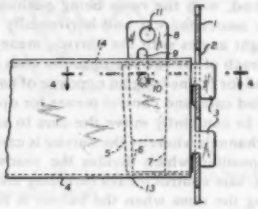
1. In an articulated connection between first and second members, the first member including a pair of parallel portions disposed on opposite sides of and pivotally interconnected to the second member by a pivot pin assembly including aligned holes located in the pair of parallel portions and the second member and a bushing located in the hole of the second member and receiving a pin extending into the holes in the pair of parallel portions, and seal means for preventing abrasive material from entering between the pin and bushing, the improvement comprising: said bushing being a predetermined length less than the length of the hole in said second member, first and second pairs of opposed Belleville springs located in the last named hole at opposite ends of the bushing and having a combined uncompressed length greater than said predetermined length less than the length of the hole; and first and second wedge means respectively interposed between the pair of parallel portions and the second member and respectively engaging one of each of said first and second pairs of Belleville springs and maintaining said first and second pairs of Belleville springs in a compressed state within the length of the hole in the second member.

4,004,856

SCAFFOLD SUBASSEMBLY

Gerhard Wesseler, Vreden, Germany, assignor to Dula-Werke Dustmann & Co., Dortmund-Hombruch, Germany

Filed Mar. 19, 1975, Ser. No. 559,935
Claims priority, application Germany, Mar. 29, 1974, 2415208
Int. Cl.² F16B 7/00
U.S. Cl. 403—186 7 Claims



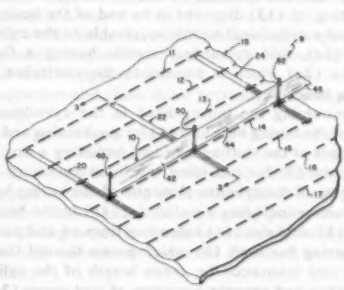
1. Cross member having end hooks for a scaffold assembly formed by a plurality of said cross members and uprights having slots in which the hooks engage to join the cross members and uprights together, and having wedges securing the cross members and uprights in place, the improvement which comprises the cross member having a hook which is secured to the cross member in an unremovable manner and so that it is longitudinally shiftable on the cross member between a retracted position permitting placement of the cross member in place between uprights to be joined thereby and an extended position for engagement of the hook in a slot of the upright, the hook having an extension projecting inwardly along the cross member and shaped to form an abutment disposed inwardly of the hook, and a vertically movable wedge secured in an unremovable manner to the hook extension for wedging against the abutment to secure the hook in place in the slot of the upright and a second abutment which is mounted on the cross member in stationary condition outwardly of the abutment of the hook for providing a pocket for the wedge between the hook abutment and the stationary abutment the unremovable mounting of the hook on the cross member being provided by interference between the wedge and the second abutment when the hook is fully extended, and interference between the wedge and a portion of the cross member when the hook is fully retracted.

4,004,857

MOVEABLE BARRIER APPARATUS FOR ROADWAY

Robert M. Eschen, Jr., 440 Grand Ave., Oakland, Calif. 94610

Filed Sept. 19, 1975, Ser. No. 614,916
Int. Cl.² E01F 13/00
U.S. Cl. 404—6 6 Claims



1. Moveable barrier apparatus for dividing parallel lanes of a roadway, comprising the combination of a plurality of spaced-apart elongate channels embedded in the roadway and

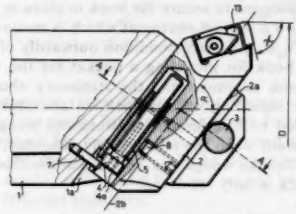
extending transversely of the lanes, a car mounted for longitudinal movement within each channel, an elongate upstanding barrier mounted above the roadway for movement with the cars, the barrier extending in a direction lengthwise of the lanes, actuator means within each channel, the actuator means being interconnectted between one end of the respective channel and the car which is associated therewith, said actuator means associated with each channel comprising a pair of extensible hydraulic rams, each ram having a head end and a rod end, with the rams being positioned on opposite sides of the associated car and horizontally oriented at substantially right angles with the barrier, means for connecting one end of each of the rams to opposite ends of the respective channels and for connecting an opposite of each of the rams to the associated cars, and control means for operating the actuator means to conjointly move the cars to selected positions within the channels whereby the barrier is carried to a selected transverse position which divides the roadway into parallel traffic lanes, said control means including means for hydraulically locking the rams when the barrier is fixedly positioned whereby shock forces impacting upon either side of the barrier are carried through and resisted by the hydraulic fluid locked within the rams and thereafter by the channels and roadway.

4,004,858

ADJUSTABLE BORING BAR PROVIDED WITH HARD METAL SHIFTING TIP FOR METAL WORKING

Andras Szilva, Jaszbereny, Hungary, assignor to Apritogepgyar, Jaszbereny, Hungary

Filed May 2, 1975, Ser. No. 573,990
Claims priority, application Hungary, May 3, 1974, AI 234
Int. Cl.² B23B *29/10*
U.S. Cl. 408—153 **2 Claims**



1. An adjustable boring bar for coarse and for fine machining comprising:

a boring bar shaft (1) connectable to a machine tool, the shaft having a cylindrical bore (1*a*) disposed at an angle with the geometrical axis of the boring bar shaft (1);

a boring head (2) disposed in said bore (1*a*) and including a shifting tip (13) disposed in an end of the boring head (2) and a cylindrical mantle receivable in the cylindrical bore (1*a*), said cylindrical mantle having a flattened portion (2*a*) which is parallel to the centerline of the boring head (2);

means mounting the boring head in the cylindrical bore (1*a*) of the boring bar shaft (1) for positioning and orienting edges of the shifting tip (13), including a first adjusting screw (3) for providing the force necessary for the fastening of the cylindrical mantle of the boring head (2) and further including a radial slot (1*b*) in the boring bar shaft (1), said slot (1*b*) extending from an end portion of the boring bar shaft (1) which points toward the workpiece and intersects the entire length of the cylindrical bore (1*a*) and wherein a portion of said screw (3) penetrates said bore (1*a*) in a chord-like fashion perpendicular to said slot (1*b*) and wherein said portion of said screw (3) is parallel to the flattened portion (2*a*) on the cylindrical mantle of the boring head (2);

a second adjusting screw (4) for coarse adjustment of the boring head (2) disposed in the mantle of the boring head (2) parallel to and displaced from the axis of said mantle, an end portion (4*a*) of said second adjusting screw (4) pointing outwardly from the mantle of the boring head; and

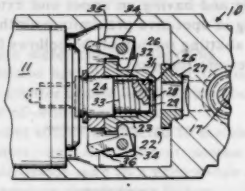
a dowel pin limiting member (7, 17) having one fixed end portion and the other end portion extending into the cylindrical bore (1*a*) and abutting against the end portion (4*a*) of the second adjusting screw (4).

4,004,859

AIR TOOL WITH SPEED RESPONSIVE SHUTOFF

John A. Borries, Chesterland, Ohio, assignor to Cooper Industries, Inc., Houston, Tex.

Filed Aug. 18, 1975, Ser. No. 605,224
Int. Cl.² F01D *25/00*
U.S. Cl. 415—25 **6 Claims**



1. A speed responsive shutoff for a rotary air tool driven by an air motor operable by a throttle valve with an air passage therebetween, comprising:

an air shutoff valve in the air passage between the air motor and the throttle valve including means biasing the valve toward its closed position to close off the air passage;

said shutoff valve including a valve seat positioned in the air passage, a valve head movable toward and away from the valve seat, means defining an expansible chamber behind the valve head for urging the valve head toward the closed position when the chamber is pressurized, an orifice through the valve head establishing communication between the expansible chamber and the upstream side of the valve head, said orifice being sufficiently small to enable upstream air pressure on initial opening of the throttle valve to open the valve against the biasing means sufficiently to run the air motor up to said predetermined speed level;

means for opening the shutoff valve response to the attainment of a predetermined motor speed level; and

means for dissipating air pressure from the expansible chamber when the throttle valve is closed;

whereby, when the air motor slows to a second speed level under load, the biasing means overcomes the opening means and moves the valve head toward the closed position, and as air pressure builds upstream of the valve head, the expansible chamber becomes pressurized to at least partially offset the effect of upstream air pressure, allowing the valve to be closed under the influence of the biasing means.

4,004,860

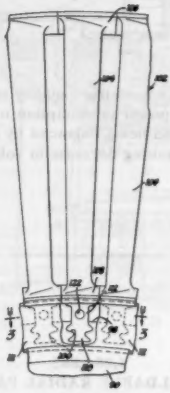
TURBINE BLADE WITH CONFIGURED STALK

Ted F. Gee, Greenwood, Ind., assignor to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 489,606, July 22, 1974, Pat. No. 3,952,391. This application Dec. 22, 1975, Ser. No. 643,155
Int. Cl.² F01D *5/30*
U.S. Cl. 416—2 **1 Claim**

1. In a turbine of the type having a free shaft coupled to a load and an exhaust passage defined in part by an outer shroud surrounding the shaft for directing combustion products pro-

duced by combustion of air and fuel supplied from an overspeed protected control system through the exhaust passage with the free shaft being susceptible to speed increases in excess of a rated maximum speed upon loss of load and failure of the overspeed protection fuel system, the combination of a rotor wheel having an outer peripheral rim, said rotor wheel having a high tensile strength and a material strength reduction under operating conditions not in excess of 3.3 standard deviations from its statistical mean strength, means coupling said rotor wheel to said shaft, a plurality of dovetail slots in said peripheral rim, a ring of turbine blades located at spaced circumferential points on said wheel peripheral rim extending into said exhaust passage, each of said blades having a high



tensile strength and a material strength development under operating conditions not to exceed 1.5 standard deviations from its statistical mean strength, each of said blades including a root having a multiple dovetail form fit within one of said slots, each of said blades having a stalk portion with end walls and parallel side walls located radially outwardly of said peripheral rim and having each of said end walls and side walls thereon machined to maintain a controlled rectangular area therethrough, a circular hole directed through each of said stalks at a point radially outwardly of said rim, said hole having an area with relation to the machined cross section of said stalk to assure separation of said blades from said rim at said hole prior to the average tangential stress in said wheel exceeding 0.9 of the ultimate tensile strength of said wheel.

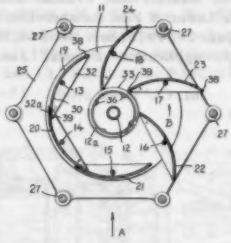
4,004,861

WIND DRIVEN PRIME MOVER

Charl Soules, 37 Kingsdale Ave., Willowdale, Ontario, Canada M2N 3W3

Filed June 13, 1975, Ser. No. 586,541
Int. Cl.² F03D 7/06
U.S. Cl. 416—41 **6 Claims**

1. In a wind driven power producing apparatus, a wind driven prime mover comprising a rotatable circular turntable having an axial (shaft) rotatably mounted on a fixed base, a plurality of arcuate shaped wind vanes automatically opened and closed solely by wind action, said vanes being pivotally mounted on the turntable (at right angles) parallel to the axis of rotation of the turntable, said pivots being located substantially centrally between the outside edge and inside edge of the vane, the vanes being of a length that in a closed position the (leading) inside edge of one vane will (overlap) underlie the (trailing) outside edge of the preceding vane and (stop means limiting the pivot movement of the vanes to an) in the open



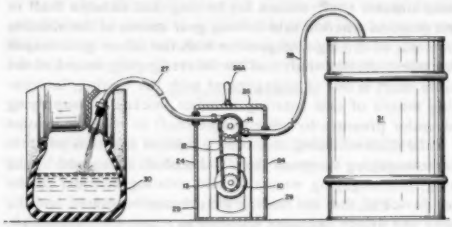
position in response to the wind velocity the inside edge will engage against the axial shaft.

4,004,862

BATTERY POWERED FLUID TRANSFER APPARATUS

Billy R. Hill, Canyon; David L. Whatley, Amarillo, Tex., assignor to Cerco Tires Inc., Amarillo, Tex.

Filed Aug. 18, 1975, Ser. No. 605,591
Int. Cl.² F04B 21/00
U.S. Cl. 417—234 **1 Claim**



1. An apparatus for transferring liquids from a reservoir container to a vehicle tire and vise versa comprising:

a. a base,

b. motor support means upstanding from said base and secured thereto,

c. a 12 V DC motor mounted in said motor support means,

d. a positive displacement gear pump secured to the top of said motor support means,

e. a sprocket and chain drive between said motor and gear pump,

f. motor power leads adapted to be connected to the terminals of a 12 V DC battery,

g. cover means over and secured to said base and motor support means having side, end walls and a top having a handle within which said motor and pump are housed,

h. a reversing switch in circuit between said battery connection and said motor mounted exteriorly on said cover means,

i. and a supply and discharge hose connected respectively to the intake and discharge of said pump and passing through the side walls of said cover means, said supply hose being receivable in said reservoir container and said discharge hose being connectable to said vehicle tire.

4,004,863

HYDRAULIC PUMP WITH REMOTE CONTROL EQUIPMENT

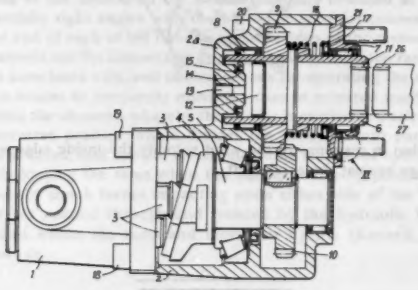
Louis-Claude Porel, Ramberville, France, assignor to Etablissements Rene Leduc & Fils, Ramberville, France

Filed Jan. 27, 1975, Ser. No. 544,382

Claims priority, application France, Jan. 30, 1974, 74.03009

Int. Cl.² F04B 9/00

U.S. Cl. 417—271 **10 Claims**



1. A hydraulic pump adapted to be driven by a rotating member of another device, said pump comprising a casing, a pump driving shaft mounted in said casing, pump means supported in said casing driven by said driving shaft, an auxiliary housing attached to said casing, a shaft slidably mounted in said auxiliary housing, driving gear means mounted on said slidable shaft, mating, interengaging mechanical means on said slidable shaft and said rotating member of said other device for directly driving the slidable shaft when said means are interengaged, gear means mounted on said pump shaft adapted to be engaged and driven by said driving gear means on said slidable shaft, means for biasing said slidable shaft to a first position wherein said driving gear means of the slidable shaft is out of driving engagement with the driven gear means of the pump driving shaft and the interengaging means of the slidable shaft is out of engagement with the mating, interengaging means of said rotating member, means for supplying fluid under pressure to said slidable shaft to move it against the force of the biasing means to a second position wherein the interengaging means of the slidable shaft is engaged by the mating, interengaging means of said rotating member of the other device so that the driving gear means is rotated and the driving and driven gears are engaged to rotate the pump shaft.

4,004,864

METHOD FOR MODIFYING A COMPRESSING APPARATUS UNIT

Lauritz Benedictus Schibbye, Saltsjo-Duvnas, Sweden, assignor to Svenska Rotor Maskiner Aktiebolag, Nacka, Sweden

Filed June 23, 1975, Ser. No. 589,210

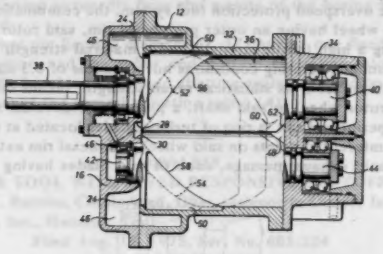
Claims priority, application United Kingdom, July 1, 1974, 29038/74

Int. Cl.² F04C 15/02

U.S. Cl. 418—1 **13 Claims**

1. Method for modifying a compressing apparatus unit to a higher compression ratio than the normal design compression ratio with substantially the same power consumption, said unit comprising a prime mover and a screw compressor directly connected thereto, said screw compressor including a barrel member and at least two intermeshing screw rotors sealingly mounted therein, said compressor being designed and dimensioned, and having predetermined design inlet port size, to accurately match the maximum available power of the prime mover at said normal design compression ratio, the normal design compression phase of said compressor beginning at a predetermined point therein,

comprising extending the inlet port of said compressor to a greater size than said predetermined design size and into said normal design compression phase of said compressor



to decrease the volumetric capacity of said compressor, the increase in power consumption owing to the higher compression ratio being balanced by a decrease thereof owing to the resulting decrease in volumetric capacity.

4,004,865

PUMP WITH YIELDABLE RADIAL PARTITIONS AND ROTATABLE SIDE PLATES

Yoshi Ikeda, Musashino; Kenji Osada, Tokyo, and Kazumi Doi, Mitaka, all of Japan, assignors to Nikkiso Eiko Co., Ltd., Tokyo, Japan

Filed Apr. 29, 1974, Ser. No. 464,926

Claims priority, application Japan, May 1, 1973, 48-49511; Nov. 16, 1973, 48-129061; Dec. 3, 1973, 48-135960; Feb. 13, 1974, 49-17924

Int. Cl.² F01C 5/00; F04C 5/00

U.S. Cl. 418—45 **4 Claims**

1. A volume pump having a pump chamber formed between an inner sleeve and a concentrically arranged outer sleeve, a plurality of normally closed compartments within said chamber and formed by circumferentially spaced apart generally radially directed yieldable partitions extending between and engaging said inner and outer sleeves, said compartments in radial direction extending the full extent of the partitions between said sleeves, side plates for closing opposite ends of said compartments defined by said generally radially directed partitions, one of said plates having suction means for the compartments formed therein and the other of said side plates having delivery means for the compartments formed therein, and rotatable deflection means within said inner sleeve to successively change the volume of said compartments, each of the side plates being rotatable and being formed with symmetrical ports, the port size of each side plate being variable as a function of volume change of a compartment governed by said deflection means during rotation thereof.

4,004,866

GEROTOR DEVICE WITH VALVE COMPENSATING MEANS

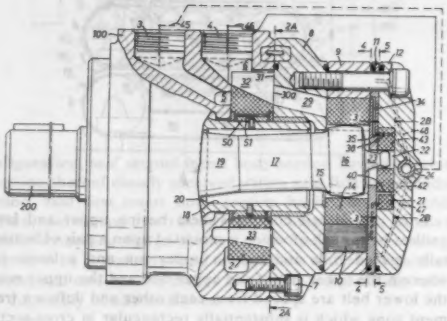
Carl Verner Ohrberg, Nordborg, Denmark, assignor to Danfoss A/S, Nordborg, Denmark

Filed Nov. 10, 1975, Ser. No. 630,294

Claims priority, application Germany, Nov. 12, 1974, 2453560

Int. Cl.² F01C 1/02, 21/12; F03C 3/00; F15B 11/10

U.S. Cl. 418—61 B 3 Claims



1. A rotary piston machine comprising a casing having interchageable fluid inlet and outlet ports, an internally toothed stator member and an eccentrically disposed externally toothed rotor member in meshing engagement, said rotor member having rotational movement about its own axis and orbital movement about the axis of said stator member with the teeth of said members intermeshing in sealing engagement to form expanding cells on one side of the line of eccentricity and contracting cells on the other side of said line during relative movement between said members, said casing having passages extending to said cells, drive shaft means in said casing connected to said rotor, distributing valve means between said ports and said passages, two way pressure responsive motor means connectin said distributing valve means to said shaft means allowing limited relative motion therebetween, two way pressure responsive control valve means connected to said inlet and outlet ports and said motor means for selectively actuating said motor means in either direction to change the positional setting of said distributing valve means relative to said shaft means, a stationary plate adjacent said rotor and stator members having circumferentially arranged sensing orifices in respective proximity to said cells, a sensing valve engaging said plate and being connected in driving relation to said shaft means for rotation at the orbiting speed of said rotor member, a first sensing port in said sensing valve on the line of eccentricity thereof and dual sensing ports straddling said line of eccentricity, said first sensing port being connected to one side of said control valve means and said dual sensing ports being connected to the other side of said control valve means, said sensing ports being cooperable with said sensing orifices to determine if said distributing valve means is in phase with said rotor member and to compensate if necessary by actuating said control valve means which in turn actuates said motor means for adjusting said distributing valve means relative to said shaft means.

4,004,867

HIGH VOLTAGE CABLE SPLICE APPARATUS

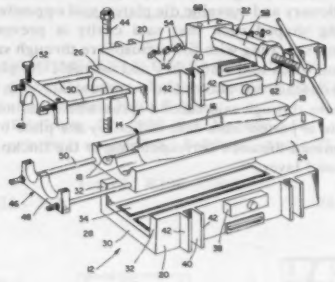
Arthur L. Nelson, La Jolla, Calif., assignor to Hexcel Corporation, Dublin, Calif.

Filed Feb. 25, 1975, Ser. No. 552,903

The portion of the term of this patent subsequent to Apr. 29, 1992, has been disclaimed.

Int. Cl.² B29H 5/16; B29C 27/00

U.S. Cl. 425—11 11 Claims



1. In apparatus for forming insulation about an uninsulated section of a conductor of a high voltage cable and having a mold defined by opposing mold halves which form a mold cavity therebetween into which the uninsulated conductor section is placed; a pressure platen in contact with each mold half; means for biasing the pressure platens against each other to thereby firmly close the mold; means for heating the mold; and means for introducing into the cavity a heat softenable and curable insulating material; the improvement comprising: a plurality of vent holes extending from the cavity through the mold to the exterior for venting to the atmosphere entrapped gas and insulating material, the vent holes being tapered over at least a portion of their length and having a major diameter proximate the cavity to prevent hardened insulating material disposed in such vent holes from breaking from the newly formed insulation when the cable is removed from the mold.

4,004,868

INJECTION MOLD FOR LAMINATED ARTICLE

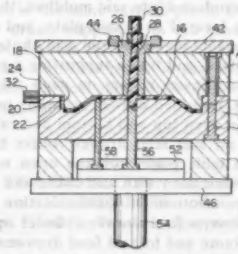
Keiki Ohdate, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Japan

Filed Sept. 30, 1975, Ser. No. 618,229

Claims priority, application Japan, Oct. 1, 1974, 49-112298; Oct. 1, 1974, 49-112299

Int. Cl.² B29F 1/05

U.S. Cl. 425—130 5 Claims



1. A mold for the injection molding of a laminated article plastic having a first layer of a first resin and a second layer of a different second resin, the mold comprising:

a stationary die plate;

a movable die plate juxtaposed against said stationary die

plate in such an arrangement that the contacted end faces of said stationary and movable die plates are locally spaced from each other to form a cavity corresponding in shape and dimensions to said first layer and that the dimensions of said cavity are enlarged when said movable die plate is parted from said stationary die plate;

a first sprue formed in said stationary die plate for providing fluid communication between said cavity and the atmosphere; and

a second sprue formed in said movable die plate, said second sprue being defined by opposite end faces of said stationary and movable die plates, said opposite end faces being shaped such that said cavity is prevented from communicating with the atmosphere through said second sprue when said stationary and movable die plates are in full contact but allowed to communicate with the atmosphere through said second sprue when said movable die plate is parted from said stationary die plate by a predetermined distance corresponding to the thickness of said second layer.

4,004,869

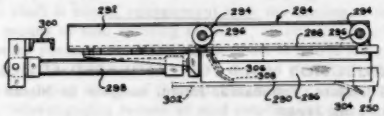
BLOCK MOLDING MACHINE WITH FEED DRAWER CONTROL MEANS

Milo G. Balhorn, Waterloo, Iowa, assignor to Old Fort International Inc., Adrian, Mich.

Division of Ser. No. 544,137, Jan. 27, 1975, Pat. No. 3,961,874. This application Feb. 13, 1976, Ser. No. 657,944

Int. Cl.² B28B *13/02*

U.S. Cl. 425—159 **3 Claims**



1. In a block molding machine, a frame, a moldbox supported by the frame and open at the top, a table plate generally in the plane of the open to of the moldbox and supported by the frame adjacent to the moldbox, a chute for receiving material to be introduced into said moldbox, the outlet end of said chute being located over said plate, and a feed drawer assembly for charging material from said chute into the open top of said moldbox, said frame supporting a pair of horizontally spaced feed drawer rollers on each side of said feed drawer assembly, said feed drawer assembly including a feed drawer having an open top and bottom and rails on opposite sides for travel on said feed drawer rollers between a first position on said table plate with the open top of the feed drawer in communication with said chute and a second position with the open bottom in communication with the open top of the moldbox, a feed drawer cylinder operatively connected to said frame and to said feed drawer for moving the feed drawer between its first and second positions, said feed drawer cylinder being double acting, and control means operatively connected to said feed drawer cylinder for actuating said feed drawer cylinder so that said feed drawer cylinder reciprocates said feed drawer in relatively short strokes for a selected time period after the feed drawer is initially moved over said moldbox to charge the latter.

4,004,870

DUAL-BELT COOLING SYSTEM

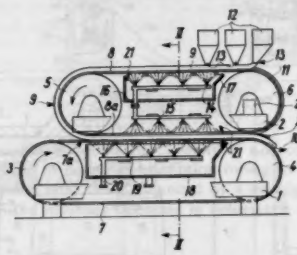
Manfred Guttinger, Stuttgart, and Konrad Schermutzki, Schmiden, both of Germany, assignors to Sandco Ltd., Ottawa, Canada

Filed June 4, 1975, Ser. No. 583,515

Claims priority, application Germany, June 5, 1974, 2427058

Int. Cl.² B29C *23/00*

U.S. Cl. 425—224 **4 Claims**



1. In a dual-belt cooling system having upper and lower endless belts each of which is mounted upon a pair of horizontally spaced rolls and has an upper run and a lower run, wherein the lower run of the upper belt and the upper run of the lower belt are spaced from each other and define a treatment zone which is substantially rectangular in cross-section and through which a product layer passes in direct heat exchange relationship with coextensive surfaces of both of said belts, and means for providing a coolant in contact with the surfaces of said belts which are on the opposite sides of said coextensive surfaces whereby heat is extracted from the opposite sides of said product layer through the respective belts and to the coolant, the upper surface of said upper run of said upper belt extending horizontally, that improvement which comprises feed means to deposit said product layer upon said top surface of said upper run of said upper belt whereby the product layer passes along said upper run and thence downwardly through an arc of the order of 180° around one of said drums and enters said treatment zone, and cooling means to supply coolant to the bottom surface of said upper run of said upper belt and thereby precool the product layer and solidify it sufficiently to ensure that the product layer will maintain continuous contact with both belts when passing through said treatment zone.

4,004,871

MOLD GATE APPARATUS

Claude Hardy, 35268 Bennett, Livonia, Mich. 48152

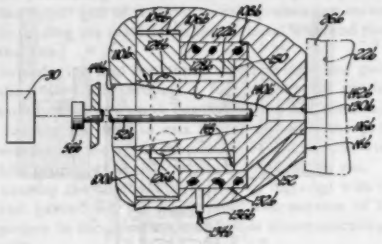
Continuation of Ser. No. 339,642, March 12, 1973, abandoned. This application Apr. 3, 1975, Ser. No. 564,728

Int. Cl.² B29F *1/03*

U.S. Cl. 425—243 **14 Claims**

1. A mold gate insert assembly, comprising insert body means having an inlet end and an outlet end, axially extending passage means formed through said insert body means and having an inlet opening formed in said inlet end and an outlet opening formed in said outlet end, said passage means being effective for enabling the flow therethrough of moldable material from an associated source of said material to an associated mold cavity, said insert body means comprising first and second insert body sections, one of said insert body sections being received by the other of said insert body sections and being sealingly secured to each other, chamber means defined by at least one of said first and second insert body sections as to be situated generally radially outwardly of said passage means and effective to carry therethrough fluid coolant means so as to thereby create a cooling effect along a first axially extending zone of said passage means, and generally annular electri-

cal heating means carried by said insert body means and situated generally radially outwardly of said passage means so as to thereby create a heating effect along a second axially extending zone of said passage means, said chamber means and said heating means being spaced from each other as to have a portion of said insert body means generally therebetween, said first insert body section being of a sleeve-like



configuration, said second insert body section having at least a portion thereof closely received within said first insert body section, said first insert body section having an axial end surface, said second insert body section comprising an annular radially extending flange surface, said flange surface being adapted to be in sealingly fixed engagement with said axial end surface, and said heating means being situated generally radially outwardly of said chamber.

4,004,872

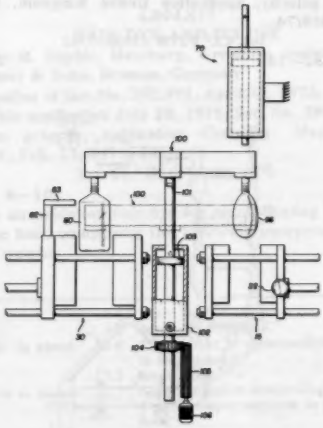
APPARATUS FOR BLOW MOLDING PLASTIC ARTICLES

Thomas J. Krall, and Albert R. Uhlig, both of Toledo, Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 461,286, April 16, 1974, abandoned. This application June 11, 1975, Ser. No. 585,933

Int. Cl.² B29C *17/67*

U.S. Cl. 425—326 B **9 Claims**



1. In an apparatus for blow molding a plastic article by successive pre-form blowing and final article blowing steps, said apparatus including a pre-form blowing station interposed between a parison extrusion station and a final blow mold station, the improvements of a pre-form blow mold linearly movable between said parison extrusion station and said pre-form blowing station, means for opening and closing said pre-form blow mold, a fixed final blow mold located at said final blowing station spaced from said pre-form blowing station, means for opening and closing the final blow mold independently of said means for opening and closing said pre-form blow mold, a rotary turret arcuately movable about an axis intermediate said pre-form blowing station and said final blowing station to transfer the blown pre-form from said pre-form blowing station to said final blowing station, means for vertically raising and lowering said turret, a blow tube carried by said rotary turret and aligned with each blowing station in sequence as the turret is indexed, and means for supplying blow air to said tube for providing a source of blow air at each mold location.

4,004,873

CONTINUOUSLY OPERATING PRESS

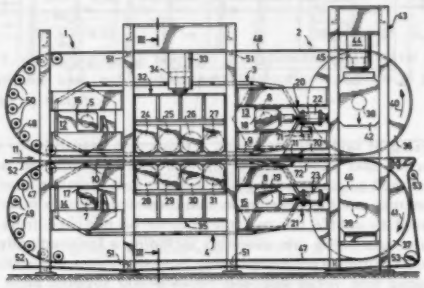
Albert De Mets, Roeselare, Belgium, assignor to Konstruktiewerkhuizen DeMets N.V., Belgium

Filed Aug. 27, 1975, Ser. No. 608,344

Claims priority, application Belgium, Aug. 27, 1974, 147937

Int. Cl.² B29C *15/00*

U.S. Cl. 425—335 **26 Claims**



1. In a continuously operating press for the production of particle boards such as chip boards, fiber boards and the like from particle fleeces, comprising two endless plate belts arranged one above the other and consisting of belt plates pivoted to one another, said plate belts rotating about horizontal and parallel axes, the runs of the plate belts facing each other being driveable in the same direction by pressure rolls, and an endless steel band surrounding each endless plate belt, the improvement comprising at least one large-diameter drum arranged in each space surrounded by the respective endless steel bands, the large-diameter drums being positioned behind the respective endless plate belts with respect to the motion direction of the facing runs of said plate belts, the diameters of the largediameter drums being larger than the diameters of each of said pressure rolls, at least two large-diameter drums being supported in the same vertical plane, at least one of the large-diameter drums supported in the same vertical plane being moveable towards the other large-diameter drum supported in the same vertical plane so that the large-diameter drums in the same vertical plane can exert an adjustable compressive force on the particle fleece passing therebetween.

4,004,874

APPARATUS FOR PRODUCTION OF CAST CONCRETE MEMBERS

Larry W. Foster, Franklin, Tenn., assignor to Span-Deck, Inc., Franklin, Tenn.

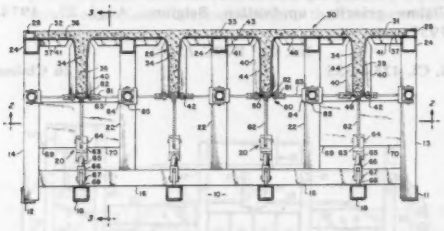
Filed June 19, 1974, Ser. No. 480,944

Int. Cl.² B28B *7/10*

U.S. Cl. 425—438 **4 Claims**

1. Apparatus for the production of cast concrete structural members comprising a stress frame, a mold form open from the top to receive a fluid concrete mix and carried by said frame, said mold form including at least one pair of substan-

tially vertically disposed spaced side members closed off at opposite end and a horizontally disposed pallet closing off the lower end of the mold form, a side member springing mechanism for flexing said side members laterally away from each other at the lower ends after the concrete mix has been set in said form, said springing mechanism including a first yoke pivotally connected to the lower end of one of said side members of a pair, a second yoke pivotally connected to the lower end of the other of said side members of said pair, a first and a second connecting rod each affixed at one end to said first and said second yokes, respectively, a third yoke connected to the other end of said first connecting rod, a fourth yoke connected to the other end of said second connecting rod, a drive bar, means pivotally connecting said third and said fourth yokes to said drive bar, means connected to said drive bar for actuation thereof from a first to a second position to affect



flexing of said side members, a swing arm assembly for supporting said pallet, said swing arm assembly adapted to be activated to elevate the pallet and the cast member after the concrete mix has been set in said form and the side members flexed to enable the cast member to be removed from the form, said swing arm assembly including a longitudinally extending support plate depending from said pallet, a plurality of spaced frist yokes disposed beneath said support plate and being pivotally connected to said support plate, a plurality of spaced second yokes pivotally connected to said stress frame and a plurality of connecting rods each connected at opposite ends to one of said plurality of first yokes and one of said plurality of second yokes, hydraulic actuating means connected to said support plate for displacing said support plate lengthwise of the form and thereby activating said swing arm assembly to elevate said pallet and the cast member set in the form.

4,004,875

LOW NOX BURNER

John Smith Zink, and Hershel E. Goodnight, both of Tulsa, Okla., assignors to John Zink Company, Tulsa, Okla.

Filed Jan. 23, 1975, Ser. No. 543,231

Int. Cl.² F23J *15/00*

U.S. Cl. 431—9 **5 Claims**

1. A fluid fuel burner designed to produce minimum quantities of NOx, comprising:

a. a nozzle for injection of fuel into a first combustion zone surrounded by a first ceramic tile, and means to supply said fuel under pressure to said nozzle;

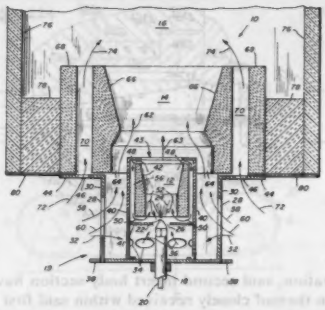
b. means adjacent said nozzle to supply a limited volume of primary air in the region of said nozzle, the volume being insufficient for complete combustion of said fuel;

c. an enclosure means surrounding and spaced from said first ceramic tile to define a first annular space communicating the outlet of said first combustion zone with the region of said nozzle;

d. means to recirculate a portion of the products of combustion from said first combustion zone around the outside of said first tile through said annular space to the vicinity of said nozzle;

e. a cylindrical wall annularly spaced from and surrounding said enclosure, said wall having openings therein to supply therethrough air, a portion of which becomes said volume of primary air, a remaining and larger portion being secondary air;

f. means to supply said secondary air in heat exchange relation with the outside of said enclosure means to cool said recirculated products thence to a second combustion zone downstream from said first combustion zone, the



quantity of secondary air being sufficient to theoretically completely combust said fuel, said second zone surrounded by second ceramic tile;

g. a second annular space surrounding said second tile in communication with the outlet of said second combustion zone; and

h. means to supply tertiary air to said outlet of said second combustion zone via said second annular space.

4,004,876

METHOD OF BURNING PULVEROUS RAW MATERIAL AND ROTARY KILN PLANT THEREFOR

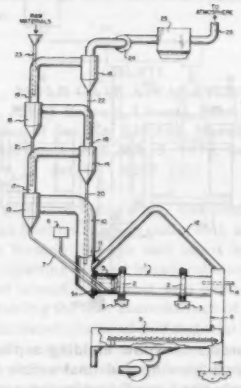
Karl Jens Sylvest, Copenhagen Valby, Denmark, assignor to F. L. Smidth & Co., Cresskill, N.J.

Filed Mar. 19, 1975, Ser. No. 559,705

Claims priority, application United Kingdom, Mar. 22, 1974, 12858/74

Int. Cl.² F27B *15/00, 7/02*

U.S. Cl. 432—14 **28 Claims**



1. A method of heat treating pulverous raw material consisting entirely of, or at least containing a substantial portion of, lime to produce at least a partial calcination thereof prior to passing the material down through an inclined rotary kiln for

further heat treatment, the kiln having hot gases generated therein and communicating at its material inlet end portion with a multistage raw material preheating means and a calcination chamber through which the hot kiln gases are directed for at least partially calcining the preheated material, and at the material outlet end portion with means for cooling the kiln product comprising:

a. feeding pulverous raw material to said preheating means for preheating with the hot kiln exit gases passing from the upper end of the kiln to said preheating means prior to feeding the material to the material inlet end portion of the kiln;

b. introducing into the upper material inlet end portion of the rotary kiln proper, a fuel capable of producing a combustible gas upon contacting the hot material;

c. causing the fuel to mix intimately with the preheated material in the upper material inlet end portion within the kiln proper so as to produce a combustible gas;

d. causing the combustible gas to be directed with the kiln exit gases from the upper inlet end portion of the kiln proper to the calcination chamber communicating therewith;

e. suspending substantially uncalcined raw material in the calcination chamber in said gas mix;

f. directing into the calcination chamber a sufficient amount of preheated oxygen-containing gas from the cooling means so as to contact the suspension of gas and raw material in the chamber and causing the oxygen-containing gas to be ignited and to thereby preheat and at least partially calcine substantially isothermally, the raw material suspended in the combined gases in the calcination chamber;

g. directing the combined stream of hot gases and preheated, at least partially calcined material into the last stage of the preheating means;

h. separating the treated material from the combined stream of exit gases from the calcination chamber; and

i. feeding the treated material to the upper material inlet end portion of the kiln for further heat treatment in the kiln and for mixing with fuel therein to continuously produce combustible gas with said fuel.

4,004,877

HAIR DYE AND ITS USE

Johannes R. Saphir, Hamburg, Germany, assignor to Carl Brehmer & Sohn, Bremen, Germany

Continuation of Ser. No. 355,971, April 30, 1973, abandoned. This application July 28, 1975, Ser. No. 599,399

Claims priority, application Germany, May 5, 1972, 2222001; Feb. 22, 1973, 2308678

Int. Cl.² D06P *3/00, 5/00*

U.S. Cl. 8—10 **12 Claims**

1. An air oxidation hair dye for reconstituting natural and synthetic hair, comprising the following components in percent by weight:

	15.5	water free of oxygen
	1.0	monoethanolamine
about 4.0 to about	12.0	5% solution of p-aminodiphenylamine in isopropanol
	17.5	formamide
about 0.56 to about	1.7	copper solution comprising 4 parts copper sulphate in crystal form 4 parts tartaric acid 4 parts monoethanolamine 88 parts water free oxygen
	14.0	4% solution of polyvinylpyrollidone in isopropanol and
	38.3	isopropyl alcohol.

3. An air oxidation hair dye for reconstituting natural and synthetic hair, comprising the following components in percent by weight:

55.25	isopropyl alcohol
0.86	N-phenyl-p-phenylenediamine
21.00	formamide
21.27	distilled water
1.32	monoethanolamine
0.10	copper sulphate in crystal form with 5 mole of H_2O
0.10	tartaric acid as said complex forming agent and
0.10	sorbitan-mono-oleate derivative.

5. An air oxidation hair dye for reconstituting natural and synthetic hair, comprising the following components in percent by weight:

55.00	isopropyl alcohol
1.37	N-phenyl-p-phenylenediamine
21.00	formamide
20.93	distilled water
1.36	monoethanolamine
0.12	copper sulphate in crystal form with 5 moles of H_2O
0.12	tartaric acid and
0.10	sorbitan-mono-oleate derivative.

7. An air oxidation hair dye for reconstituting natural and synthetic hair, comprising the following components in percent by weight:

55.00	isopropyl alcohol
0.87	ortho-phenylenediamine
0.52	p.p.-diaminediphenylamine sulphate
0.35	N-phenyl-p-phenylenediamine
21.00	formamide
1.36	monoethanolamine
20.60	distilled water
0.10	copper sulphate (crystals with 5 moles of H_2O)
0.10	tartaric acid and
0.10	sorbitan-mono-oleate derivative.

9. A hair dye for reconstituting natural and synthetic hair, consisting of an air oxidation hair dye, a metal complex compound and a solvent which keeps the air oxidation hair dye and the metal complex compound in solution, said metal complex compound consisting of a metal present in a quantity ranging from 0.1% to less than 1% by weight and selected from the group consisting of copper, iron, manganese, cobalt, nickel, chromium, titanium, tin, hafnium, zinc, vanadium, zirconium and molybdenum; a complex forming agent present in the weight percent range corresponding to that of said metal quantity given above, and monoethanolamine ranging from 1.0% to 1.36% by weight, said solvent ranging from 38.3% to 55.25% by weight, said solvent comprising formamide said percent by weight referring to the weight of the total composition.

4,004,878

PROCESS FOR THE PREPARATION OF PILLING-RESISTANT FIBER PRODUCTS FROM POLYESTERS

Karl-Heinz Magosch, and Jörn Rüter, both of Marl, Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Filed Oct. 7, 1975, Ser. No. 620,286

Claims priority, application Germany, Oct. 15, 1974, 2448954

Int. Cl.² D06M *11/02*

U.S. Cl. 8—115.5 **7 Claims**

1. In the method for producing pilling-resistant fiber products from polyesters containing 0.5 to 5.0 molar percent, based on the acid component of a compound containing ace-

tal groups which is bifunctional with respect to the polyesterification, the improvement comprising treating threads and fibers produced from said polyesters with aqueous acids.

4,004,879

PROCESS FOR WET TREATMENT OF TRAVELLING WEBS

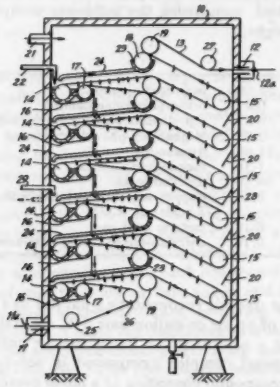
Christian August Meier-Windhorst, late of Hamburg, Germany, and by Eike Meier-Windhorst, heir, Heidenkampsweg 66, 2000 Hamburg 1, Germany

Filed May 23, 1975, Ser. No. 580,453

Claims priority, application Germany, May 25, 1974, 2425374

Int. Cl.² D06B 3/02, 21/02

U.S. Cl. 8—149.1 **7 Claims**



1. A continuous process for the wet treatment of elongated webs of textile materials and the like with treating liquids, comprising the steps of:

a. introducing said web into, and moving it generally upward through a closed treatment chamber containing a hot gaseous treatment medium, while guiding the web upwardly through a plurality of vertically spaced-apart and horizontally disposed treatment stages within said chamber;

b. each of said treatment stages comprising guiding the web in a generally horizontal direction into and through a bath of hot treating liquid located on one side of the interior of said chamber, then guiding the web through said hot gaseous medium in a generally horizontal direction to the opposite side of said chamber, then reversing the direction of movement of the web, passing the web through squeezing means to remove excess treating liquid, and then moving the web upwardly to the next treatment stage;

c. subjecting the generally upwardly moving web to the application of downwardly moving squeezed-out treatment liquid (1) between said squeezing step and immersion in the next bath and (2) after its emergence from said next bath, each squeezing step serving to separate the preceding and following treatment stages; and

d. removing the treated web from said chamber.

4,004,880

METHOD AND APPARATUS FOR CUSHIONING CONTINUOUS EXOTHERMAL REACTIONS

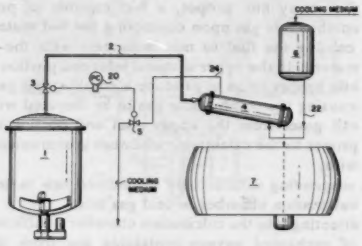
Franz Langheim, and Michael Braasch, both of Marl, Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Filed May 29, 1975, Ser. No. 581,935

Claims priority, application Germany, June 14, 1974, 2428705

Int. Cl.² B01J 3/02, 4/00

U.S. Cl. 23—230 A **6 Claims**



1. A method for cushioning continuous exothermal reactions by the expansion of gases during an over-pressure condition during a power failure, comprising:

a. conducting a continuous exothermal reaction in a reactor under elevated gas pressure in the presence of liquefied gases;

b. at pressures beyond a given safe pressure, expanding said liquefied gases into a condenser to lower said elevated gas pressure below said given safe pressure;

c. condensing said gases in said condenser;

d. collecting the condensed gases in an accumulator;

e. supplying cooling medium to said condenser at a pressure head sufficient to discharge the cooling medium through the condenser; and

f. initiating said expanding and said supplying for cushioning said exothermal reaction during an over-pressure condition during a power failure.

4,004,881

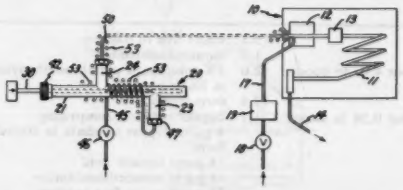
APPARATUS FOR GENERATING CARRIER GAS-TEST SPECIMEN VAPOR MIXTURES FOR DELIVERY INTO A GAS CHROMATOGRAPH

Woodfin V. Ligon, Jr., Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Dec. 18, 1975, Ser. No. 641,837

Int. Cl.² G01N 31/08, 31/12

U.S. Cl. 23—232 C **4 Claims**



1. In a gas chromatograph instrument including a hollow coil gas chromatographic column having an inlet end to receive a mixture of carrier gas and test specimen vapor and an outlet end adapted for connection to a mass spectrometer, the combination of specimen vapor generation and delivery apparatus comprising as an assembly:

a. a barrel open at one end to receive a specimen to be

vaporized and delivered quantitatively into the gas chromatographic column and having carrier gas inlet and outlet opening axially spaced for carrier gas flow through the barrel in contact with a specimen contained therein,

b. a carrier gas conduit connected to the inlet end of the said column and to the barrel and communicating with the barrel gas outlet opening to receive carrier gas and specimen vapor mixtures for delivery into the said column,

c. a carrier gas supply line connected to the barrel and communicating with the carrier gas inlet opening of the barrel,

d. an elongated cylindrical probe slidable axially in the barrel having a specimen-receiving chamber and axially spaced carrier gas inlet and outlet openings for registry respectively with the barrel inlet and outlet openings,

e. barrel closure means secured to the open end of the barrel including a releasable seal cooperating with the probe to close the barrel open end against gas flow while carrier gas is flowing in contact with a test specimen in the barrel, and

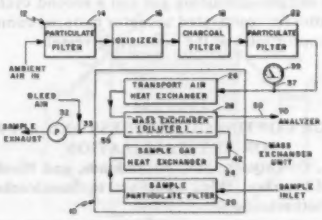
f. heating means comprising an electrical resistance heating coil disposed around the barrel between the carrier gas inlet and outlet openings and around the conduit for vaporizing a test specimen in the barrel and preventing condensation of the resulting vapor prior to delivery of the carrier gas and vapor mixture into the inlet end of the gas chromatographic column.

4,004,882

GAS ANALYSIS DILUTER

James Donald Byrne, San Diego, and Paul Arthur Griffith, Fallbrook, both of Calif., assignors to Monitor Labs, Incorporated, San Diego, Calif.

Filed Aug. 14, 1975, Ser. No. 604,879
Int. Cl.² G01N *1/22*
U.S. Cl. 23—254 R **9 Claims**



1. A gas analysis diluter comprising:

diffuser barrier means comprising a tubular gas pervious membrane having an inlet end connected to receive a transport gas stream, a conduit surrounding said tubular membrane and having an inlet end connected to receive a sample gas stream,

said gas pervious membrane having a large relative mass conductance to a selected molecular species of said sample gas,

a transport gas heat exchanger for heating the sample gas to a selected temperature,

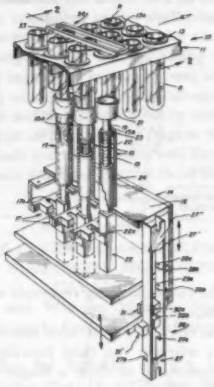
a sample gas heat exchanger for heating the sample gas to said selected temperature.

4,004,883

SENSING, LEVELING AND MIXING APPARATUS

Rolf Meyer, Des Plaines; Manuel I. Martin, Hoffman Estates, and Ronald A. Bolton, Chicago, all of Ill., assignors to G. D. Searle & Co., Skokie, Ill.

Filed July 11, 1975, Ser. No. 594,936
Int. Cl.² C12K *1/00*; G01N *1/18*
U.S. Cl. 23—259 **9 Claims**



1. An apparatus for sequentially sensing, leveling and moving a plurality of tubular receptacles having open upper ends, said apparatus comprising a support unit for accommodating the receptacles whereby the upper end of each receptacle is frictionally engaged by means carried on the support unit and the lower end of each receptacle depends freely from the support unit, said support unit being intermittently moved to successive stations; sensing and leveling means disposed at a first station and having a first member positioned over said unit when the latter is at the first station and being vertically adjustable relative to said unit, said first member, when moving in one direction, being adapted to engage the upper ends of a predetermined number of receptacles and cause the latter to assume a first vertical position with respect to said support unit, and a second member disposed beneath said unit when the latter is at the first station and being vertically adjustable in timed sequence with said first member, said second member being movable upwardly and adapted to resiliently engage the lower ends of the predetermined number of receptacles while the latter are held in the first vertical position by said first member, said second member moving the resiliently engaged receptacles to a second vertical position when said first member moves out of engagement with the upper ends of said predetermined number of receptacles whereby the latter, when in said second vertical position, have the lower ends thereof disposed in a common horizontal plane; and means disposed at a second station for engaging and imparting orbital motion to the receptacle lower ends disposed in said common plane when said support unit is disposed at said second station.

4,004,884

TIME DIVISION METERING SYSTEM

Joseph John Zdrodowski, Nutley, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

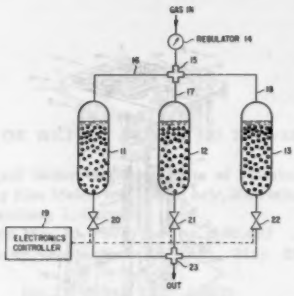
Filed July 2, 1976, Ser. No. 702,242
Int. Cl.² G01N *1/18*, *31/08*
U.S. Cl. 23—259 **7 Claims**

1. A time division metering system comprising in combination:

A. a plurality of fluid reservoir vessel means each said vessel means being in operative fluid flow relationship with a

valve means said valve means controlling the flow of fluid from said vessel means;

B. electronic controller means in electronic control relationship with said plurality of valves wherein said electronic controller means provides a signal to each said valve means in preselected order, said signal causing each said valve means to open for a predetermined interval and at a predetermined frequency thereby allowing fluid to



flow from the corresponding reservoir vessel means so as to achieve rapid cycling;

C. tee means in operative fluid flow relation with each said valve means wherein the fluid flowing from said valve means are combined to form a single final fluid stream containing quantities of the respective fluids from said reservoir vessel means in exact ratio to the time intervals each corresponding valve means was held open.

4,004,885

REMOVAL OF SULFUR OXIDES AND PARTICULATE MATTER FROM WASTE GAS STREAMS

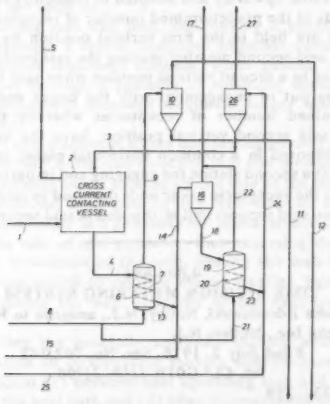
Willem Groenendaal; Friedrich C. Taubert, both of The Hague; Jaap E. Naber, and Gijsbertus A. Bekker, both of Amsterdam, all of Netherlands, assignors to Shell Oil Company, Houston, Tex.

Division of Ser. No. 467,530, May 6, 1974, Pat. No. 3,966,879. This application Mar. 15, 1976, Ser. No. 666,827

Claims priority, application United Kingdom, May 8, 1973, 21848/73

Int. Cl.² B01D *41/02, 46/32;* **B01J** *8/12*

U.S. Cl. 23—260 **1 Claim**



1. An apparatus suitable for use in the removal of sulfur oxides and particulate matter from waste gases which comprises:

a. a contacting vessel having an inlet for waste gases containing sulfur oxides and particulate matter and an outlet for waste gas substantially free of sulfur oxides and particulate matter, an internal compartment containing a moving bed of supported, copper-containing acceptor for sulfur oxides, said internal compartment being defined by perforated walls disposed inside the contacting vessel, an inlet for fresh supported copper-containing acceptor in fluid communication with said internal compartment and an outlet for said acceptor loaded with sulfur oxides and particulate matter also in fluid communication with said internal compartment, and a means for directing the flow of said waste gases and said moving bed of acceptor cross-currently to one another, said waste gas flowing through the perforated walls of said internal compartment containing said moving bed of acceptor;

b. a first purge vessel for removing particulate matter from the acceptor having a bottom inlet for purge gas and a top outlet for purge gas and particulate matter, a top inlet for acceptor material loaded with sulfur oxides and particulate matter connected to the loaded acceptor outlet of said contacting vessel and a bottom outlet for purged acceptor material, at least one perforated plate disposed in the vessel at an angle with the vertical for transporting the loaded acceptor material from its inlet to the outlet and a means for passing said purge gas through said perforated plate thereby stripping said particulate matter from said loaded acceptor during its transport on said perforated plate;

c. a first vertical riser tube debouching into a first cyclone for removing sulfur oxides from the acceptor, having a bottom inlet for purged acceptor material connected to the bottom outlet of the first purge vessel and a bottom inlet for reducing gas, a first cyclone top outlet for sulfur oxide-containing gas and a first cyclone bottom outlet for reduced acceptor material;

d. a second purge vessel with a bottom inlet and a top outlet for a purge gas, a top inlet for reduced acceptor material connected to the first cyclone bottom outlet and a bottom outlet for purged acceptor material and at least one perforated plate disposed in the vessel at an angle with the vertical for transporting acceptor material from its inlet to the outlet, and

e. a second vertical riser tube debouching into a second cyclone for reactivating the acceptor having a bottom inlet for purged acceptor material connected to the bottom outlet of the second purge vessel and a bottom inlet for an oxygen-containing gas, a second cyclone top outlet for the oxygen-containing gas and a second cyclone bottom outlet for reactivated acceptor material connected to the acceptor inlet of the contacting vessel.

4,004,886

TWO STAGE CONTINUOUS PROCESS AND APPARATUS FOR CRYSTALLIZATION

Henricus A. C. Thijssen, Son, Netherlands, and Nicolaas J. J. Huige, Milwaukee, Wis., assignors to Stamicarbon B.V., Geleen, Netherlands

Continuation of Ser. No. 340,933, March 13, 1973, abandoned, and a continuation-in-part of Ser. No. 96,467, Dec. 9, 1970, abandoned. This application Mar. 7, 1975, Ser. No. 556,340

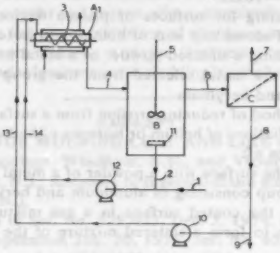
Claims priority, application Netherlands, Dec. 12, 1969, 6918686; Mar. 2, 1970, 7002961

Int. Cl.² B01D *9/04*

U.S. Cl. 23—273 F **7 Claims**

1. In an apparatus for producing crystals from a stream of solution comprising a heat exchange vessel for producing crystal nuclei whereby said solution is caused to become supersaturated with respect to said crystallizable component and to form said nuclei; a crystallizer vessel for recrystallizing whereby crystal growth is promoted and a separator vessel wherein a first conduit means connects said crystallizer vessel

to said heat exchange vessel and a second conduit means connects said crystallizer vesel to said separator vessel so that said solution passes continuously from said heat exchange vessel to said crystallizer vessel wherein small crystals are formed in said heat exchange vessel and larger crystals are formed in said stream of solution in said crystallizer vessel and wherein crystals are separated from said solution in said separator vessel, the improvement comprising wherein the crystallizer is equipped with a means for rapidly mixing the stream of solution to produce a substantially homogenuous mixture



therein and promote growth of said larger crystals whereby substantially all of said small crystal nuclei are dissolved thereby promoting growth of said larger crystals, and the apparatus includes a means for removing crystal-free liquor from said crystallizer vessel and means to recirculate crystal-free solution from said crystallizer vessel to said heat exchange vessel while retaining the crystals dispersed in said crystallizer vessel and a third conduit connected between said heat exchange vessel and said crystallizer vessel for carrying the crystal-free solution.

4,004,887

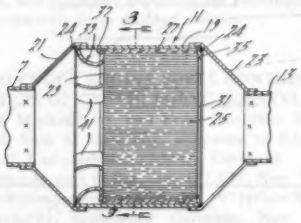
CATALYTIC CONVERTER HAVING A RESILIENT THERMAL-VARIATION COMPENSATING MONOLITH-MOUNTING ARRANGEMENT

James D. Stormont, Grass Lake, Mich., assignor to Tenneco Inc., Racine, Wis.

Filed Mar. 16, 1973, Ser. No. 342,264

Int. Cl.² F01N *3/15, 7/00, 7/16*

U.S. Cl. 23—288 FC **12 Claims**



1. A catalytic converter unit adapted for use in the exhaust system of a combustion engine comprising, a housing having a cylindrical shell and end members attached to opposite ends of the shell and providing respectively and inlet and outlet for said converter unit, a unitary block-like refractory monolithic honeycomb catalyst element supported in said shell, differential growth compensating clamp means for holding the catalyst element in a desired longitudinal position in the shell comprising a first member that is integral with said shell and substantially rigid with respect to the shell and having a first shoulder for operative engagement with the element to oppose movement thereof in one longitudinal direction and a second member having a second shoulder for operative engagement with an outer circumferential annular portion of the element to oppose movement thereof in the opposite longitudinal direction, said second member being longitudinally resilient and acting to apply continuous pressure to hold the element against the first shoulder, said members having thermally expansive lengths and said length of the first member being greater than said length of the second member, both said members being composed of metal and having coefficients of thermal expansion greater than that of the catalyst element and said coefficient of the second member being greater than that of the first member and providing a differential thermal compensating means for the lesser rate of thermal expansion of the element as compared to the shell over the entire temperature range to be experienced by the converter, said second member being annular and including a multiplicity of circumferentially separated reversely bent and bowed spring fingers extending axially away from said second shoulder to make said second member longitudinally resilient, and means anchoring the ends of said spring fingers remote from said element to said shell and maintaining said fingers in a continuous state of tension at all temperatures of the converter.

4,004,888

EXHAUST GAS CLEANING ARRANGEMENT WITH A RESILIENTLY SUPPORTED MONOLITHIC CERAMIC CATALYZER

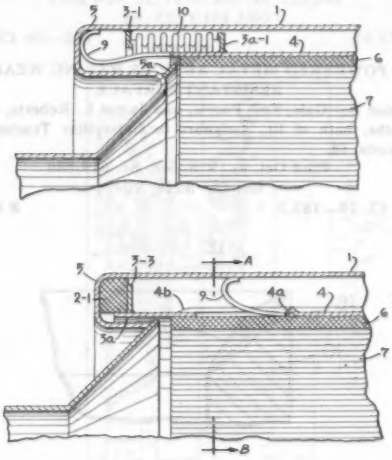
Reimar Musall, and Wilhelm Wolsing, both of Hannover, Germany, assignors to Kali-Chemie Aktiengesellschaft, Hannover, Germany

Continuation of Ser. No. 349,414, April 9, 1973, abandoned. This application Dec. 11, 1975, Ser. No. 639,911

Claims priority, application Germany, Apr. 7, 1972, 2216644

Int. Cl.² B01J *8/00;* **F01N** *3/15*

U.S. Cl. 23—288 FC **9 Claims**



1. An apparatus for cleaning exhaust gases comprising a monolithic catalyst body suitable for removing toxic gases from a gas flow through an exhaust gas passage and a holder resiliently supporting said monolithic catalyst body, said holder comprising:

a rigid housing having an inlet opening and an outlet opening and forming an outer wall of said exhaust gas passage;

a sleeve circumferentially engaging for restraint the monolithic body to restrain substantially all axial movement of the body relative to the sleeve, said sleeve and said body being disposed in said housing;

resilient tongues, each tongue having two ends, circumfer-

entially disposed about said sleeve, said tongues engaging said sleeve near one tongue end and resiliently abutting against said housing near the other tongue end thereby resiliently supporting and centering said sleeve in, and spaced apart from, said housing; and

sealing means disposed between said sleeve and said housing and being operable to restrain the passage of exhaust gases through the space therebetween.

9. An apparatus for cleaning exhaust gases comprising a monolithic catalyst body suitable for removing toxic gases from a gas flow through an exhaust gas passage and a holder resiliently supporting said monolithic catalyst body, said holder comprising;

a rigid housing having an inlet opening and an outlet opening and forming an outer wall of said exhaust gas passage;

a damping layer composed of mineral wool circumferentially disposed about the monolithic body;

a sleeve operable to circumferentially grip the monolithic body through said layer, said sleeve and said body being disposed in said housing;

resilient tongues, each tongue having two ends, circumferentially disposed about said sleeve, said tongues engaging said sleeve near one tongue end and resiliently abutting against said housing near the other tongue end thereby resiliently supporting and centering said sleeve in, and spaced apart from, said housing; and

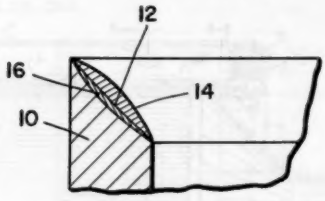
sealing means disposed between said sleeve and said housing and being operable to restrain the passage of exhaust gases through the space therebetween.

4,004,889

POWDERED METAL ARTICLE HAVING WEAR RESISTANT SURFACE

Preston Lee Gale, East Peoria, and James L. Roberts, Chillicothe, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 6, 1975, Ser. No. 619,880
Int. Cl.² B22F 7/04
U.S. Cl. 29—182.2 **8 Claims**



1. A metal article consisting of a body of a pressed, sintered and heat treated metallic powder of a first metal or metal alloy having a given melting temperature and a wear-surface of fused metal bonded to a surface of said body, said wear-surface having a fine dendritic structure and consisting of a second metal or metal alloy having a melting temperature approaching said given melting temperature of said first metal or metal alloy, said body having minute voids between the particles of said metallic powder and a portion of said fused metal of said wear-surface being received within said voids to a limited depth of not more than about 0.003 in (0.0076 cm) at said surface of said body without substantial alloying between said fused metal and said particles of said metallic powder.

4,004,890

METHOD AND MEANS OF REDUCING EROSION OF COMPONENTS OF PLASMA DEVICES EXPOSED TO HELIUM AND HYDROGEN ISOTOPE RADIATION

Manfred S. Kaminsky, Hinsdale; Santosh K. Das, Naperville, and Thomas D. Rossing, De Kalb, all of Ill., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Feb. 9, 1976, Ser. No. 656,214
Int. Cl.² B22F 3/00
U.S. Cl. 29—182.3 **7 Claims**

1. A coating for surfaces of plasma devices exposed to radiation of atoms and ions of helium and isotopes of hydrogen comprising a sintered powder of a metal and an oxide of the metal, the metal selected from the group consisting of aluminum and beryllium.

3. A method of reducing erosion from a surface exposed to particle radiations of helium or isotopes of hydrogen comprising the steps of:

coating the surface with a powder of a metal selected from the group consisting of aluminum and beryllium; and

sintering the coated surface in a gas mixture containing oxygen to form a sintered mixture of the metal and its oxide.

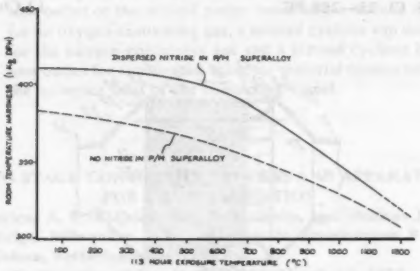
7. In a plasma containment device the improvement wherein the surfaces of said device that are exposed to radiation by atoms or ions of helium or isotopes of hydrogen are formed of a sintered powder of a metal and its oxide, the metal selected from the group consisting of aluminum and beryllium.

4,004,891

SUPERALLOYS CONTAINING NITRIDES AND PROCESS FOR PRODUCING SAME

Ching San Lin, Sayre, and James Thomas Smith, Towanda, both of Pa., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Continuation of Ser. No. 343,873, March 22, 1973, abandoned, which is a continuation of Ser. No. 146,198, May 24, 1971, abandoned. This application Feb. 5, 1975, Ser. No. 547,110
Int. Cl.² B22F 5/00
U.S. Cl. 29—182.5 **1 Claim**



1. A superalloy composition resulting from a process wherein a first superalloy composition having a predetermined atomic ratio of metallic elements, containing from about 50 to about 75 weight percent of nickel, and having a second metal selected from the group consisting of titanium, aluminum, zirconium, and additional metallic materials alloyed with said nickel, is converted to a second superalloy composition by nitriding said second metal to form a dispersion of a metal nitride selected from the group consisting of titanium nitride, aluminum nitride, zirconium nitride, and mixtures thereof; and said second superalloy having the same atomic ratio of metals as said on first superalloy composition when said metal nitride is calculated on the basis of the metallic content thereof.

4,004,892

COOKWARE FABRICATED FROM COMPOSITES OF COPPER, ALUMINUM AND STAINLESS STEEL

John B. Ulam, McMurray, Pa., assignor to Clad Metals, Inc., Canonsburg, Pa.

Division of Ser. No. 423,253, Dec. 10, 1973, Pat. No. 3,952,938. This application Apr. 29, 1975, Ser. No. 572,732
Int. Cl. B32B *15/18; 15/20*
U.S. Cl. 29—196.2 3 Claims

1. A hot pressure bonded metallic composite consisting essentially of a core which consists of a member from the group consisting of copper and copper alloys completely coated by a member from the group consisting of aluminum and aluminum alloys, said core forming a major thickness portion of said composite, and at least one outer cladding layer of stainless steel.

4,004,893

METHODS FOR MOLDING COAL AND LIKE MATERIAL

Francis J. Cumings, Windham, N.H., and Victor Kevorkian, Belle Mead, N.J., assignors to Ingersoll-Rand Research, Inc., Princeton, N.J.

Continuation of Ser. No. 529,023, Dec. 3, 1974, abandoned. This application Jan. 30, 1976, Ser. No. 653,699
Int. Cl.² C10L *5/00, 5/22*
U.S. Cl. 44—10 H 2 Claims

1. A method for molding coal and like firm brittle material which can be converted to a plastic-like substance through the application of heat, comprising the steps of providing the material in a solid form, supplying said material in such solid form into an injection bore which includes a discharge opening for discharging material to a mold, heating said supplied material in said injection bore to a temperature sufficiently great to convert the material from solid form to plastic-like condition while rotatably driving a screw conveyor in said injection bore to convey the material in plastic-like condition through said injection bore to a space adjacent to said discharge opening, accumulating said material in plastic-like condition in said space into an axially-growing mass, and axially displacing said screw conveyor by said growing mass to cause said screw conveyor to be moved away from said discharge opening for a controlled distance, then axially driving said screw conveyor towards said discharge opening to drive such accumulated material in plastic-like condition through said discharge opening into the mold cavity of a closed multi-part mold, molding the material in plastic-like condition into an article in said mold cavity and thereafter opening said multi-part mold and discharging the molded article from said mold cavity, and cyclically repeating the beforegoing steps to thereby successively form molded articles.

4,004,894

OTTO CYCLE ENGINE FUELS CONTAINING DERIVATIVES OF CYCLIC POLYCARBOXYLIC ACIDS

Heinz Nohe, Meckenheim, and Ernst Guenther Nottes, Limburgerhof, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Continuation-in-part of Ser. No. 417,127, Nov. 19, 1973, abandoned. This application Mar. 28, 1975, Ser. No. 563,051
Claims priority, application Germany, Nov. 18, 1972, 2256690
Int. Cl.² C10L *1/22*
U.S. Cl. 44—58 7 Claims

1. A liquid hydrocarbon fuel for an Otto cycle engine which contains a deposit and residue inhibiting amount of an oil-soluble and gasoline-soluble derivative of a cyclic polycarboxylic acid of the formula (I):

$$[A](COX)_m \quad (I)$$

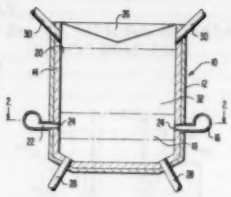
in which A is the radical of a monocyclic, bicyclic or tricyclic non-aromatic polycarboxylic acid of a total of eight to sixteen carbon atoms including *m* carboxyl groups, *m* being from 3 to 6, X denotes identical or different groups OR, OR is the radical of an alcohol of 1 to 20 carbon atoms with the proviso that at least two of the identical or different radicals R have each at least 8 carbon atoms.

4,004,895

COAL REACTOR

Louis Gold, 2725 39th St., NW., Washington, D.C. 20007

Continuation-in-part of Ser. No. 355,400, May 30, 1973, abandoned. This application Apr. 29, 1975, Ser. No. 572,769
Int. Cl.² C10J *3/00, 3/08*
U.S. Cl. 48—101 6 Claims



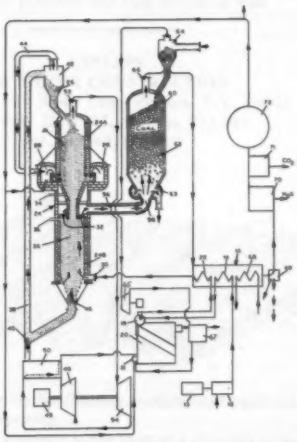
5. A coal reactor for the clean combustion of sulfur bearing coal in the presence of limestone comprising a truncated vertical shaft furnace having an internal combustion chamber with a diameter substantially equal to the height, means for introducing coal and limestone at the top of said furnace, a ring of circumferentially spaced tuyeres extending through the vertical wall of the furnace and spaced above the bottom, means for introducing an ambient temperature air blast, means for removing the sulfur bearing slag from the bottom of sid furnace and means for removing the gaseous effluent resulting from said combustion.

4,004,896

PRODUCTION OF WATER GAS

Shao L. Soo, Urbana, Ill., assignor to University of Illinois Foundation, Urbana, Ill.

Filed Nov. 21, 1974, Ser. No. 525,955
Int. Cl.² C10J *3/00*
U.S. Cl. 48—202 18 Claims



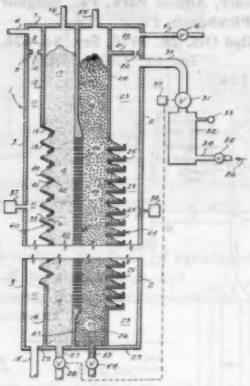
1. In a method of producing synthesis gas by reacting carbon and steam in a reaction vessel, including introducing solid carbon and steam to said reaction vessel and supplying heat to said vessel sufficient for the reaction of said solid carbon with steam, the improvement comprising supplying superheated steam to said vessel at a temperature and in a quantity sufficient to provide the entire heat of reaction for the reaction of said carbon with a portion of said superheated steam, said superheated steam being substantially the only source of heat supplied to said carbon in said reaction vessel, and wherein said reaction vessel is substantially free from an oxygen containing gas.

4,004,897

FILTERING DUSTY GAS IN IMPROVED PANEL BED

Arthur M. Squires, 245 W. 104 St., New York, N.Y. 10025

Filed Aug. 28, 1974, Ser. No. 501,278
Int. Cl.² B01D 46/04
U.S. Cl. 55—96 3 Claims



1. The method of treating a gas involving the separation and removal of particulate material by means of a filter of granular material which comprises

a. arranging the granular material in a bed having apertured outer walls having a plurality of transversely disposed upwardly spaced gas entry portions separated by interposed supporting members, each member having an upper and a lower surface, each of said upper and lower surfaces having outer and inner edges with respect to the filter bed, said surfaces being articulated at an edge joint at their respective inner edges, said gas entry portions having gas entry faces substantially contigous with said outer edges of said upper surfaces, a line being drawn through a said outer edge of a said lower surface and also through said inner edge joint of the next subjacent member forms an angle less than about 60° from the horizontal and said filter bed having gas exit portions spaced from said inner edge joints;

b. forwardly flowing the gas for treatment in a substantially continuing flow through the gas entry portions of the granular material bed and outwardly from the gas exit portions to separate and accumulate particulate material at said gas entry faces;

c. stopping the flow of said gas;

d. causing a transient flow of gas to move in the direction in reverse to the flow of said gas in (b);

e. causing said transient reverse flow to produce first, a rise in the pressure difference at a given rate of rise between the gas exit portions and the gas entry portions and subsequently a fall in the pressure difference between the gas exit portions and the gas entry portions, said pressure difference remaining greater than a first critical minimum difference for a time interval of less than about 150 milliseconds, said first critical pressure difference being that at which a steady flow of gas in the reverse direction just produces a localized spill of granular material from the gas entry faces, and the pressure difference produced by said transient reverse flow peaking to a top value beyond a second critical minimum difference, which is the pressure difference at which a transient flow of gas in the reverse direction producing said pressure difference at said given rate of rise just initiates a body movement of the granular material supported by said members toward the gas entry faces to spill a portion of the granular material and accumulated particulate material from the bed; and

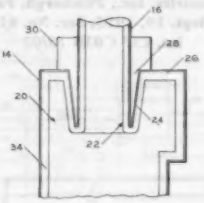
f. supplying fresh granular material to said bed to replace material spilled from said gas entry portions.

4,004,898

CYCLONE SEPARATOR GAS TUBE HEAT DISSIPATOR

Bodo Kalen, Dix Hills, N.Y., assignor to Emtrol Corporation, Great Neck, N.Y.

Filed Jan. 30, 1976, Ser. No. 653,617
Int. Cl.² B04C 3/02
U.S. Cl. 55—267 9 Claims



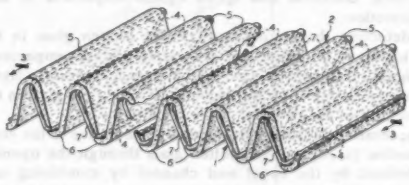
1. A cyclone separator having a housing comprised of a metallic exterior separator shell and interior wall insulating means, said separator shell having a generally cylindrical top portion provided with a horizontally tangentially extending gas inlet, a gas outlet at the top of the separator shell comprising a vertically extending metallic tubular member, said tubular member having a lower portion extending into the top portion of the separator shell, said lower portion of the tubular member being connected at its bottom to an inverted frustoconical upwardly diverging wall, said diverging wall forming part of the top portion of the separator shell to provide a heat dissipating air space between the lower portion of said tubular member and said diverging wall, the insulating means comprising an insulating layer on the interior of the separator shell covering at least the top portion of the shell and the interior wall of the tubular member and said diverging wall.

4,004,899

AIR FILTER CONSTRUCTION

Alfred Giacovas, 669 Wolfs Lane, Pelham, N.Y. 10083

Filed Feb. 28, 1975, Ser. No. 553,881
Int. Cl.² B01D 27/06
U.S. Cl. 55—499 1 Claim



1. A filter assembly for filtering contaminant particles from a gas stream, comprising

a filter medium disposed in the form of a plurality of spaced-apart pleats and defining a plurality of corrugations,

a self-supporting fiber strand supporting said filter medium and including a plurality of longitudinal portions and forming a plurality of corrugations in order to maintain said filter medium in its spaced-apart pleated form,

each of said longitudinal portions being disposed in a bend of said pleats of said filter medium, so as to locate the longitudinal portions of said strand on alternate opposite sides of the filter medium for engagement with said filter medium at said bends of said filter medium,

said fiber strand including connecting portions connecting

the ends of each of said longitudinal portions; yield the spacing between said pleats, and

said connecting portions of each of said longitudinal portions being directed towards the adjacent bend of the next opposite of said pleats, and said connecting portions are disposed outside of said filter medium.

4,004,900

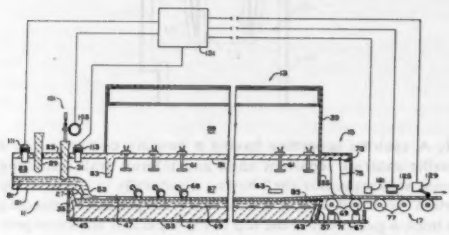
MANUFACTURE OF FLAT GLASS AT CONTROLLED THROUGHPUT RATE

Joseph R. Staahl, Jr., Conneaut Lake; Joseph M. Matesa, Pittsburgh, and David E. Worth, Atlantic, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Sept. 19, 1975, Ser. No. 614,829

Int. Cl.² C03B *18/02*

U.S. Cl. 65—29 **9 Claims**



1. In the method of stabilizing the volumetric flow of molten glass in making flat glass comprising the steps of discharging molten glass of varying temperature through an opening defined by a channel and a movable tweel having its position adjusted and maintained to control the size of the opening; flowing the discharged molten glass onto a pool of molten metal in an enclosed forming chamber; advancing the glass along the surface of the pool of molten metal while cooling it and while applying forces to it to form a dimensionally stable, continuous sheet of glass; withdrawing the formed continuous sheet of glass from the pool of molten metal and from the enclosed forming chamber; and conveying the continuous sheet of glass therefrom; the improvement which comprises periodically controlling the volumetric throughput of glass wherein all signals are in common physical units and during each control period the control comprises:

a. detecting the width, thickness and speed of the continuously formed sheet of glass and generating representative width, thickness and speed signals responsive to said detection;

b. detecting the temperature of the molten glass in the vicinity of the tweel and generating a glass temperature signal responsive thereto which glass temperature signal is representative of the viscosity of the molten glass in the vicinity of the tweel;

c. generating a throughput signal representative of the volumetric throughput of molten glass through the opening defined by the tweel and channel by combining said width, thickness and speed signals as a product of said width, thickness and speed signals;

d. detecting the difference between said throughput signal with a predetermined throughput signal representative of a desired throughput and generating a first control signal responsive to said detected signal difference;

e. detecting the difference between said glass temperature signal with said first control signal and generating a second control signal equal to a second control signal generated during the previous control period less a fixed factor of said detected signal difference which is related to a ratio of incremental tweel height change to an incremental glass temperature change; and

f. adjusting and maintaining the position of the tweel responsive to said second control signal whereby during each control period a greater tweel opening is provided for glass of increased viscosity and a lesser tweel opening is provided for glass of decreased viscosity.

4,004,901

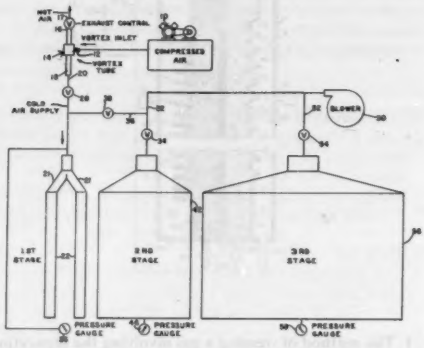
TEMPERING GLASS SHEETS

Eugene W. Starr, Allison Park, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Oct. 28, 1975, Ser. No. 626,590

Int. Cl.² C03B *27/00*

U.S. Cl. 65—114 **6 Claims**



1. A method of tempering a glass sheet comprising the steps of:

a. heating the glass sheet to an elevated temperature sufficient for tempering;

b. cooling the surfaces of the glass sheet by impinging chilled tempering medium having a first temperature upon the glass at a first pressure so as to establish a thermal gradient through the glass thickness and harden the surfaces of the sheet;

c. further cooling the surfaces of the glass sheet by impinging tempering medium having a second temperature higher than said first temperature upon the glass at a second pressure higher than said first pressure so as to continue maintenance of a thermal gradient through the glass thickness and impart a tempered condition thereto; and

d. cooling the glass sheet through its thickness to ambient temperature.

4,004,902

METHOD OF DYEING AND TREATING GLASS STREAMS

Helmut Pieper, Lohr (Main), Germany, assignor to Nikolaus Sorg G.m.b.H. & Co., Pflochsbach, Germany

Filed July 23, 1974, Ser. No. 491,125

Claims priority, application Germany, Jan. 25, 1974, 2403476

The portion of the term of this patent subsequent to Mar. 9, 1993, has been disclaimed.

Int. Cl.² C03B *5/02*

U.S. Cl. 65—134 **2 Claims**

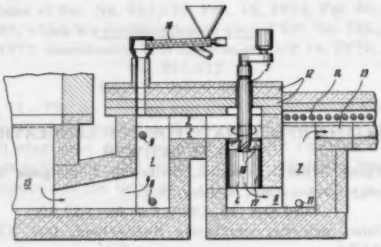
1. A method of treating a glass stream for dyeing and refining the glass in said stream which comprises the steps:

a. heating the glass stream while flowing in a vertical upward flow by applying electrical energy to at least two electrodes disposed one above the other in said vertical upward flow causing a rising glass stream above said electrodes,

b. thereafter passing the stream with a free surface horizontally while supplying dyes, color frits or a pre-dyed glass stream to said free surface of said glass stream at a point directly above said electrodes within said vertical upward

flow to prevent freezing of the glass when said dyes, frits or stream are added,

c. subsequently flowing the stream vertically downwards with mechanical agitation through a passage having a



circular cross-section, the force of agitation being opposite the flow of the glass stream, and

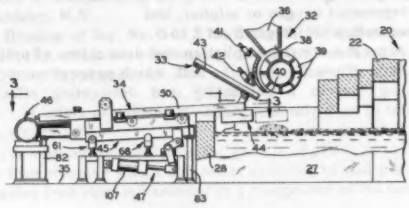
d. thereafter flowing the stream upwards for further processing or treatment.

4,004,903

METHOD OF AND APPARATUS FOR INCREASING THE MELTING RATE OF GLASS MAKING MATERIALS

Lloyd W. Daman, Pemberville; Earl A. Hille, Elmore, and Donald E. Shamp, Millbury, all of Ohio, assignors to Libbey-Owens-Ford Company, Toledo, Ohio

Filed June 5, 1975, Ser. No. 584,104
Int. Cl.² C03B *3/00*
U.S. Cl. 65—135 **10 Claims**



1. In a glass melting furnace of the type having a melting chamber containing a bath of molten glass and a batch feeding apparatus for loosely depositing glass making materials in a transversely extending row on the surface of the molten glass, the improvement comprising: means for periodically pressing said row of loosely deposited glass making materials against the surface of said molten glass for compacting said row of glass making material, and means for advancing said pressing means toward said melting chamber wherein said row of glass making materials is bodily moved along the surface of said molten glass by said pressing means said pressing means includes a pressing member and said advancing means includes means for moving said pressing member from a raised attitude to a lowered attitude to compress said loosely deposited glass making materials between said pressing members and the surface of said molten glass bath.

4,004,904

ELECTRONIC SYSTEM FOR ARTICLE IDENTIFICATION

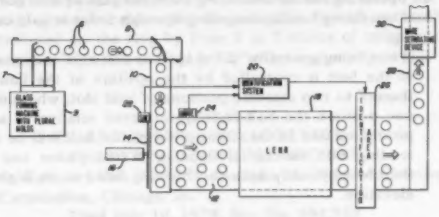
Robert Thomas Fergusson, Denver, Colo., assignor to Index, Incorporated, Denver, Colo.

Filed Aug. 4, 1975, Ser. No. 601,905
Int. Cl.² C03B *9/40*
U.S. Cl. 65—158 **23 Claims**

1. A system for identifying specific articles amongst a group of articles, the specific articles emanating from at least one predetermined source amongst a plurality of such sources, the articles being produced in a predetermined sequence relative to the sources and formed into rows in which the predetermined sequence is maintained prior to conveyance to an identification area spaced from the row formation area, said system comprising:

signal generating means for generating an output signal indicative of presence of a specific row of articles at said identification area;

first means connected with the signal generating means for receiving said output signal and, in turn, providing output signals each of which is indicative of an article within the specific conveyed row;



second means connected with said first means and providing sequential output signals each corresponding to a signal from the first means and indicative of said predetermined source from which a specific conveyed article emanated; and

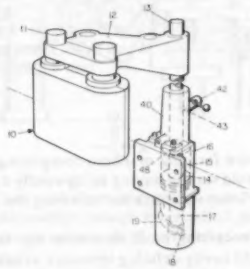
identification means at said identification area receiving said output signals from said first and second means and responsive thereto to provide an identification of selected articles with respect to a selected source of articles in said conveyed row, whereby the identity of each article of the selected articles relative to the source of the article is preserved when the articles are formed into rows.

4,004,905

SAFETY LOCK FOR FORMING MACHINE BLOWHEAD

Eustace Harold Mumford, Ottawa Lake, Mich., assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Nov. 21, 1975, Ser. No. 634,091
Int. Cl.² C03B *9/14*
U.S. Cl. 65—159 **1 Claim**



1. In apparatus for forming glass containers wherein the glass is formed into shape in a mold by a blowing head mechanism, the improvement in said blowing head comprising:

a vertically positioned, stationary, pneumatic piston-cylinder motor;

a rod connected to said piston and extending vertically upward from said stationary pneumatic motor;

a stationary support member above said motor, said support member having a generally vertical bore there- through;

said piston rod having a portion thereof extending within the bore of said stationary support member;

a blowing head arm fixed to said piston rod;

said blowing head arm extending radially from said rod and adapted to carry a relative heavy blowhead on the extending end thereof remote from the piston rod.

a radially extending casting formed on the side of said support member and having a central horizontal bore therein;

a bolt slideable in the bore of said casting;

a single radial opening formed in the side of that portion of the piston rod which registers with the bore in said casting when said rod is in its uppermost position whereby when said bolt is moved forward in said casting, it will enter the opening in said piston rod;

an operating handle extending from the side of said bolt;

said operating handle extending through a slot in said casting;

said slot being generally "Z" shaped so that axial movement of the bolt is controlled by the position of the handle thereof to two extreme portions of said slot, wherein in one position the bolt is fully retracted relative to said piston rod and in the other position the bolt will be extending into the radial opening in the piston rod to thereby physically lock the blowing head at its highest elevation.

4,004,906

GLASSWARE FORMING MACHINE OF THE I. S. TYPE FOR UPRIGHT PRESS AND BLOW PROCESS

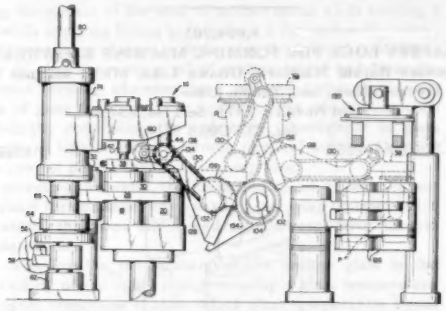
George E. Rowe, deceased, late of Wethersfield, Conn. (by Selma S. Rowe, executrix), assignor to Emhart Industries, Inc., Farmington, Conn.

Filed Jan. 31, 1975, Ser. No. 545,777

Disclosure was also published under second Trial Voluntary Protest Program on Jan. 27, 1976

Int. Cl.² C03B *9/00, 9/14*

U.S. Cl. 65—239 12 Claims



1. A glassware forming machine comprising:

a. a blank mold station having an upwardly open blank mold cavity defining structure for receiving the gobs of glass to be formed,

b. partible neck ring mold structures for mating with said blank mold cavity defining structure at said blank station,

c. parison neck forming means for insertion downwardly into the closed neck ring molds at said blank station,

d. a final blow station horizontally spaced from said blank station and having upwardly open blow mold cavity defining structure for receiving the partially formed parisons from said blank station,

e. means for transferring said parisons from said blank station to said blow station, said means including neck ring arms associated with said partible neck ring mold structures and means pivotally supporting said arms for movement about a horizontal axis located between said blank mold and blow mold stations, and

f. said transferring means further including means pivotally supporting each neck ring structure adjacent the free end of its associated neck ring arm, said neck ring mold structures supporting the parison during transfer from said blank to said blow station and also keeping the parison in an upright orientation during such transfer.

4,004,907

ARYLISOTHIOCYANATE FOR THE REGULATION OF PLANT GROWTH

Wolfgang Schmid, Therwil, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

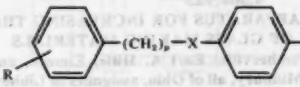
Filed Oct. 15, 1975, Ser. No. 622,596

Claims priority, application Switzerland, Oct. 22, 1974, 14102/74

Int. Cl.² A01N *9/12;* C07C *161/04*

U.S. Cl. 71—72 9 Claims

1. An arylisothiocyanate compound of the formula I



(I)

wherein

R represents hydrogen, lower alkyl, lower alkoxy or halogen,

X represents oxygen or sulphur, and

p represents an integer from 2 to 5.

8. A process for the defoliation and desiccation of unlignified parts of plants above the soil, which process comprises applying thereto a defoliating and desiccating effective amount of an arylisothiocyanate according to claim 1.

4,004,908

β-HALOGENOETHYL-SILANES AS STIMULATORS FOR LATEX FLOW

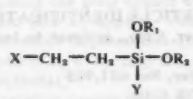
Werner Foery, Basel, and Hans Peter Fischer, Bottmingen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 443,179, Feb. 15, 1974, Pat. No. 3,912,493, which is a continuation-in-part of Ser. No. 186,392, Oct. 4, 1971, abandoned. This application July 14, 1975, Ser. No. 595,811

Int. Cl.² A01N *9/00*

U.S. Cl. 71—79 7 Claims

1. A method for the stimulation of latex flow from latex discharging plants which comprises applying to said plants a latex flow stimulating amount of a compound of the formula



wherein X is chlorine; Y is chlorine and R_1 and R_2 are both methyl, or Y is a group $-OR_3$ and each of R_1, R_2 and R_3 is an alkyl radical having 1 to 5 carbon atoms.

4,004,909

BETA-HALOGENOETHYL-SILANES AS FRUIT ABSCISSION, RIPENING AND THINNING AGENTS

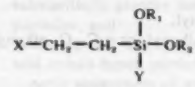
Werner Foery, Basel, and Hans Peter Fischer, Bottmingen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 443,179, Feb. 15, 1974, Pat. No. 3,912,493, which is a continuation-in-part of Ser. No. 186,392, Oct. 4, 1971, abandoned. This application July 14, 1975, Ser. No. 595,812

Int. Cl.² A01N 9/00

U.S. Cl. 71—79 6 Claims

1. A method for regulating the growth of plants as to facilitate fruit abscission, fruit thinning, and fruit ripening which comprises applying to said plants a growth-regulating amount of a compound of the formula



wherein X is chlorine; Y is a group $-OR_3$ and each of R_1, R_2 and R_3 is a group $-CO-R_4$ wherein R_4 is an alkyl radical having 1 to 5 carbon atoms.

4,004,910

BETA-HALOGENOETHYL-SILANES AS FRUIT RIPENING AGENTS

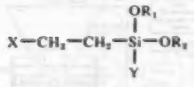
Werner Foery, Basel, and Hans Peter Fischer, Bottmingen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 443,179, Feb. 15, 1974, Pat. No. 3,912,493, which is a continuation-in-part of Ser. No. 186,392, Oct. 4, 1971, abandoned. This application July 14, 1975, Ser. No. 595,813

Int. Cl.² A01N 9/00

U.S. Cl. 71—79 5 Claims

1. A method for regulating the growth of plants as to facilitate fruit ripening which comprises applying to said plants an effective fruit ripening amount of a compound of the formula



wherein X is chlorine; Y is a group $-OR_3$ and each of R_1, R_2 and R_3 is an alkyl radical having 1 to 5 carbon atoms.

4,004,911

TRIHYDRIC ALCOHOL DERIVATIVES

Eirlys R. Isaac, Sittingbourne, and Michael D. Barker, Maidstone, both of England, assignors to Shell Oil Company, Houston, Tex.

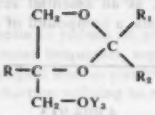
Division of Ser. No. 392,394, Aug. 8, 1973, Pat. No. 3,919,251, which is a continuation of Ser. No. 74,505, Sept. 22, 1970, abandoned. This application Apr. 18, 1975, Ser. No. 569,514

Claims priority, application United Kingdom, Sept. 23, 1969, 46745/69

Int. Cl.² A01N 9/24

U.S. Cl. 71—88 7 Claims

1. A method for controlling weeds which comprises applying to the weed habitat a herbicidally effective amount of a compound of the formula



wherein R is an alkyl group of 1 to 6 carbon atoms; R_1 and R_2 each is hydrogen, a lower alkyl group, a lower alkyl group substituted by phenyl or a phenyl group optionally substituted by chlorine or by an alkyl group, or R_1 and R_2 together may be a polymethylene group of 3 to 6 carbon atoms; and Y_3 is a phenyl group, a chlorophenyl group, or benzyl optionally substituted on the ring by from 1 to 3 atoms of chlorine or fluorine or by a lower alkyl group or by a phenyl group.

4,004,912

1-THIADIAZOLYL-6-ACYLOXYTETRAHYDROPYRIMIDINONE HERBICIDES

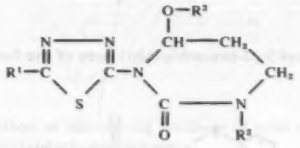
John Krenzer, Oak Park, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Filed July 10, 1975, Ser. No. 594,932

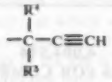
Int. Cl.² A01N 9/12

U.S. Cl. 71—90 10 Claims

1. A compound of the formula

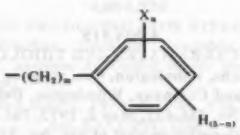


wherein R^1 is cycloalky of from 3 to 7 carbon atoms; R^2 is selected from the group consisting of lower alkyl, lower alkenyl, lower chloroalkyl, lower bromoalkyl and



wherein R^4 and R^5 are each selected from the group consisting of hydrogen and lower alkyl; and R^3 is selected from the group consisting of hydrogen and

wherein R^6 is selected from the group consisting of lower alkyl, lower chloroalkyl, lower bromoalkyl, lower alkenyl, lower alkynyl, lower alkoxyalkyl, cycloalkyl of from 3 to 7 carbon atoms and



wherein X is selected from the group consisting of lower alkyl, halogen, lower haloalkyl, nitro, cyano, and lower alkoxy, and *m* and *n* are each integers from 0 to 3.

10. A method of controlling weeds which comprises con-

tacting said weeds with a herbicidal composition comprising an inert carrier and, as an essential active ingredient, in a quantity toxic to weeds, a compound of claim 1.

4,004,913

SELECTIVE HERBICIDAL COMPOSITIONS

Helmuth Hack, Odenthal-Hahnenberg; Ferdinand Munz, Schildgen; Ludwig Eue, Cologne, and Werner Schafer, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed May 26, 1972, Ser. No. 257,366

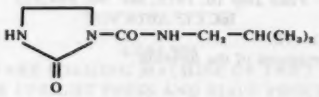
Claims priority, application Germany, June 12, 1971, 2129199

Int. Cl.[2] A01N 9/12

U.S. Cl. 71—90 **2 Claims**

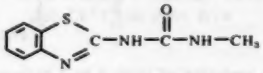
1. Selective herbicidal composition comprising, as active ingredients, in effective amounts

a. imidazolidin-2-one-1-carboxylic acid isobutylamide of the formula



and

b. 1-methyl-3-(2-benzothiazolyl)-urea of the formula



wherein the weight ratio of (a) to (b) is 0.5:1 to 5:1.

4,004,914

THIOLCARBAMATES FOR COMBATING UNDESIRED PLANT GROWTH

Werner Toepfl, Basel, Switzerland, assignor to Ciba-Geigy AG, Basel, Switzerland

Division of Ser. No. 84,465, Oct. 27, 1970, abandoned. This application Aug. 4, 1975, Ser. No. 601,962

Claims priority, application Switzerland, Nov. 3, 1969, 16351/69

Int. Cl.[2] A01N 9/12

U.S. Cl. 71—100 **3 Claims**

1. A method for combatting undesired grasses in rice cultures which comprises applying thereto a herbicidally effective amount of N-methyl-N-allyl-S-p-chlorobenzyl-thiolcarbamate.

4,004,915

HERBICIDAL CARBAMATES AND THIOLCARBAMATES

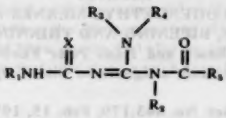
Julius Jakob Fuchs, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 356,422, May 2, 1973, Pat. No. 3,882,160, which is a continuation-in-part of Ser. No. 312,904, Dec. 7, 1972, Pat. No. 3,823,179. This application Nov. 1, 1974, Ser. No. 520,114

Int. Cl.[2] C07C 129/08; A01N 9/20

U.S. Cl. 71—106 **12 Claims**

1. A compound having the formula



wherein

R_1 is selected from a C_2 –C_8 alkyl substituted with O-1 methoxy, ethoxy, methylthio, or ethylthio group; a C_3–C_6 alkenyl; a C_3–C_4 alkynyl; [a C_4–C_8 cycloalkyl substituted with O-1 C_2–C_4 alkyl, o-2 methyl groups,

R_2 is a C_1–C_3 alkyl;

R_3 is hydrogen, methyl, or ethyl;

R_4 is a C_1–C_4 alkyl, a C_3–C_4 alkenyl, or a C_3–C_4 alkynyl;

R_5 is —OR_6,

wherein

R_6 is a C_1–C_8 alkyl substituted with 0–3 chlorine atoms or 0–1 methoxyl; and

X is oxygen.

5. A method of controlling undesirable vegetation comprising applying to the locus of the undesirable vegetation a herbicidally effective amount of at least one compound of claim 1.

4,004,916

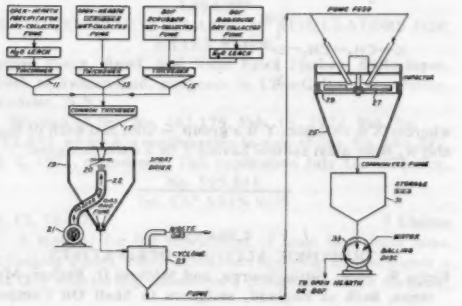
METHOD FOR AGGLOMERATING WET-COLLECTED FUME FOR USE IN METALLURGICAL FURNACES AND AGGLOMERATES PRODUCED THEREBY

John W. Kreiger, Bethlehem, Pa., assignor to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed July 1, 1975, Ser. No. 592,287

Int. Cl.[2] C22B 1/08

U.S. Cl. 75—3 **21 Claims**



1. A method for utilizing moisture-bearing iron-containing fume from steelmaking furnaces to produce green balls suitable for charging into steelmaking furnaces to recover said iron, comprising:

a. substantially instantaneously drying said fume,

b. impact-fracturing a portion of said fume whereby the Blaine surface area of said fume is not less than about 8,000 square centimeters per gram, and

c. balling said fume on a balling device while adding sufficient moisture to produce effective agglomeration.

4,004,917

ACICULAR METALLIC POWDERS PRODUCED FROM THE ORGANOMETALLIC SALTS

Robert J. Deffeyes, and Wesley R. Tyler, both of Arlington, Tex., assignors to Graham Magnetics Incorporated, Graham, Tex.

Division of Ser. No. 401,636, Sept. 28, 1973, Pat. No. 3,909,240. This application July 11, 1975, Ser. No. 595,066
The portion of the term of this patent subsequent to Sept. 30, 1992, has been disclaimed.
Int. Cl.² C22B 23/04
U.S. Cl. 75—.5 AA 9 Claims

1. A process for making cobalt based metallic particles containing at least 50% cobalt, said process comprising the steps of

1. selecting fasces-shaped metal-oxalate particles comprising said cobalt and consisting of rod like structures of substantially greater acicularity than said fasces-shaped particles, and
2. reducing said salt to cobalt-based particles

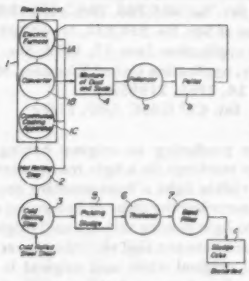
said cobalt-based particles being characterized by a magnetic squareness of at least 0.72 and a coercivity of at least 500 oersteds.

4,004,918

METHOD OF TREATING WASTE PRODUCED DURING STAINLESS STEEL MAKING

Hiroshi Fukuoka, Tokuyama; Teruhiko Kameyama, Shinnanyo; Yuji Takahashi; Kenji Nicho, both of Tokuyama; Tatsuo Misawa, Funabashi; Tsuneyuki Inoue, Ohmama, and Kimiaki Imai, Ichikawa, all of Japan, assignors to Nissin Steel Co. Ltd. and Japan Metals & Chemicals Co. Ltd., both of Tokyo, Japan

Filed June 12, 1975, Ser. No. 586,375
Claims priority, application Japan, Sept. 4, 1974, 49-100828
Int. Cl.² C21C 5/52
U.S. Cl. 75—11 8 Claims



1. A method of treating waste produced during stainless steel making and processing, comprising:

forming a sludge cake containing 2–5 weight percent water by dehydrating slurry-like pickling sludge containing 30–70 weight percent water produced during pickling treatment in connection with a cold rolling step of stainless steel processing;

kneading the sludge cake containing 2–15 weight percent water with a mixture of dust produced during stainless steel making and scale produced during a hot rolling step of stainless steel processing, thereby obtaining a kneaded mass;

adding to said kneaded mass 1 to 5 weight percent of an organic binder and less than 5 weight percent of an inorganic binder, said weight percents being based upon the solid components of said kneaded mass;

adjusting the water content while kneading to obtain a water content in the range of 8 to 20 weight percent of the total kneaded mass;

shaping the kneaded mass under pressure into the form of a briquette;

heating the briquette to reduce its water content;

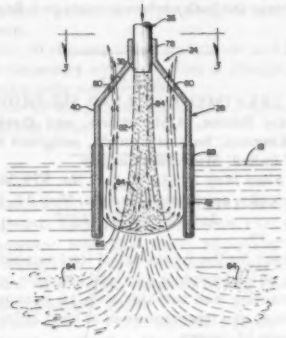
charging one or more briquettes, together with a carbonaceous reducing agent into an electric furnace for pyrometallurgically reduction refining to exact metal from such briquettes.

4,004,919

METHOD AND APPARATUS FOR TREATING METAL

William G. Wilson, Pittsburgh, Pa., assignor to Molycorp, Inc., White Plains, N.Y.

Filed Aug. 22, 1974, Ser. No. 499,397
Int. Cl.² C22C 33/08
U.S. Cl. 75—53 7 Claims



1. A method of introducing additives of solid material into a molten metal bath, comprising:

providing solid additive material in particulate form;

providing a continuous stream of carrier gas;

entraining the particles of material in the carrier gas stream to produce a fluidized mixture;

directing a free stream of the mixture downward toward the surface of the bath from a selected level above the surface at a selected velocity, at which velocity the energy of the particles is sufficient to enable them to penetrate into the bath and the energy of the gas is insufficient to enable the gas to penetrate into the bath;

utilizing the energy of the particles to separate them from the gas at the surface of the bath and drive them down into the molten metal;

providing an impervious tubular shield around the lower portion of the stream extending below the static surface level of the bath to confine the gas to a contact area substantially less than the total surface area of the bath and to prevent contact of the stream with the remaining portion of the surface of the bath; and

utilizing the resistance of the surface of the contact area of the bath to deflect the gas and cause it to flow upward in a column adjacent to the downward flowing stream and within the shield.

4,004,920

METHOD OF PRODUCING LOW NITROGEN STEEL

Richard J. Fruehan, Franklin Township, Westmoreland County, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed May 5, 1975, Ser. No. 574,804
Int. Cl.² C21C 5/34
U.S. Cl. 75—60 6 Claims

1. In a bottom blown process for the refining of molten pig iron wherein a stream of oxygen-containing gas is introduced so as to decrease the carbon content in the resulting refined molten steel to a level below 0.2 percent, said gas being introduced at a total rate R_T within the requisite throughput range,

wherein R_T is the sum of R_O, the rate at which oxygen is introduced and R_x, the rate at which other gases are introduced, and wherein R_O is at least $0.8R_T$, said bath containing an initial level of nitrogen in excess of 0.002%, said initial level being substantially in excess of that desired in the final steel product, the improvement which comprises,

a. introducing an inert gas prior to the time the carbon content of the molten bath is decreased to a level of 0.3 percent, so as to achieve a purging rate of inert gas introduction which is at least 0.8 R_T, said inert gas being introduced at said purging rate for a time sufficient to decrease the nitrogen content to a desired level which is less than 80 percent of said initial level;

b. thereafter, increasing the rate of oxygen introduction so that R_o is again at least 0.8 R_T, said increased rate of oxygen introduction being employed for a time sufficient to decrease the bath carbon content to a final level below 0.2%.

4,004,921

TREATMENT OF LEAD SULPHIDE

Stephen Peter Beaton, Amherstview, and David Alan Harbourne, Kingston, both of Canada, assignors to Du Pont of Canada Limited, Montreal, Canada

Filed May 20, 1975, Ser. No. 579,361

Claims priority, application Canada, May 23, 1974, 200712

Int. Cl.² C22B *13/00*

U.S. Cl. 75—77 **18 Claims**

1. A process for the treatment of lead sulphide to produce at least one of lead sulphite and lead sulphate comprising the step of contacting lead sulphide with an aqueous solution of sulphur dioxide at a temperature of at least 20° C substantially in the absence of oxygen.

4,004,922

FREE MACHINING STEEL

Daniel Thivellier, Faverges; Leon Seraphin, Ugine, and Roland Tricot, Albertville, all of France, assignors to Ugine Aciers, Paris, France

Filed Sept. 3, 1975, Ser. No. 610,052

Claims priority, application France, Nov. 10, 1974, 74.35231

Int. Cl.² C22C *38/60*

U.S. Cl. 75—123 AA **12 Claims**

1. A previously deoxidized, resulfurated free machining steel, having a homogeneous distribution of globular sulfides and sulfurous inclusions and having a sulfur content of about 0.04 and about 0.5% and having a greatly improved crosswise ductility and resilience, characterized in that it contains sulfur globularizing free magnesium in a quantity at the most equal to 0.005% and at the least equal to 5 thousandths of the sulfur content, said magnesium having been added to said steel subsequent to deoxidation.

4,004,923

METHOD OF USING A TEST FILM TO MEASURE DEVELOPER ACTIVITY

Roy E. Hensel, Cranbury, N.J., assignor to American Hoechst Corporation, Bridgewater, N.J.

Continuation-in-part of Ser. No. 412,405, Nov. 2, 1973, abandoned, which is a division of Ser. No. 306,325, Nov. 13, 1972, abandoned. This application Jan. 14, 1975, Ser. No. 540,831

Int. Cl.² G03C *5/04*; G03F *7/02*

U.S. Cl. 96—27 R **6 Claims**

1. A method of controlling developer activity in the processing of photosensitized printing plates comprising exposing a presensitized printing plate to a test pattern together with a film of material to be reproduced by said plate, said test pattern being composed of two configurations of regularly spaced elements of between about 55 and 90 percent area coverage, placed adjacent to one another for critical visual judgement with the unaided eye, one of said configurations being a background and the other configuration being a foreground,

said configurations being selected on the basis of larger and smaller practical total element perimeter per unit area with the configurations of larger total element perimeter being polygonal,

the background configuration having uniform element sizes of regular spacing and the other configuration having a progressive series of varying element sizes of regular spacing,

the configuration of the foreground being capable of showing a large integrated optical density change for a specific image change and the background being capable of showing relatively little integrated optical density change for the same image change,

developing said plate with fresh developer fluid,

selecting visually a region of the foreground which matches the integrated optical density of the background area on the reproduced test pattern on said plate,

repeating said steps of exposing and developing for subsequent plates,

and adding replenisher or a diluent for said developer fluid when a foreground area other than said selected foreground region blends into said background area on the reproduced test pattern configuration on one of said subsequently exposed and developed plates.

4,004,924

THERMORECORDING

Marcel Nicolas Vrancken, Hove, Belgium, and Wolfgang Lässig, Cologne-Stammheim, Germany, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Continuation of Ser. No. 405,780, Oct. 12, 1973, abandoned, which is a division of Ser. No. 550,834, May 17, 1966, Pat. No. 3,793,025. This application June 17, 1975, Ser. No. 587,642

Claims priority, application United Kingdom, May 17, 1965, 20818/65; May 24, 1965, 21985/65

Int. Cl.² G03C *5/00*, *11/12*

U.S. Cl. 96—35 **14 Claims**

1. Process for producing an original having visible light absorptive image markings on a light transparent background by exposing to visible light a heat-sensitive recording layer, which method comprises the steps of imagewise exposing said recording layer to light passing through said original while said original is disposed between said recording layer to light passing through said original while said original is disposed between said recording layer and the source of said light in heat-conductive relation to said recording layer, said recording layer consisting essentially of a hydrophilic water-removable binder having homogeneously distributed therethrough finely divided particles of a hydrophobic thermoplastic polymer normally solid at room temperature and finely divided material capable of absorbing visible light and converting such absorbed light into heat, said layer being generally transparent in the absence of said material, said exposure being for a time lasting no longer than 10^{-1} second to visible light of an intensity of at least 0.3 Watt, second per sq. cm. and sufficient to heat the areas of said layer corresponding to the transparent areas of the original to reduce the water removability thereof not sufficient to heat the areas of said layer corresponding to the image areas of said original to reduce the water removability thereof; and washing said exposed layer with an aqueous liquid to remove therefrom the areas corresponding to said image areas said finely divided light absorbing material being selected from the group consisting of carbon black, graphite, a heavy metal, or an oxide or sulfide of such heavy metal.

4,004,925
PRODUCTION OF PHOTOMASKS BY FORMING COMPLEX OF SILVER AND DIAZONIUM OR PYRYLIUM SALTS

Jan Frans Van Besauw, Mortsel, and Albert Lucien Poot, Kontich, both of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed Feb. 18, 1975, Ser. No. 550,442

Claims priority, application United Kingdom, Feb. 19, 1974, 7447/74

Int. Cl.² G03C *7/00*, *5/00*

U.S. Cl. 96—58 **14 Claims**

1. A photomask comprising a support that is transparent to ultra-violet radiation and visible light and a layer incorporating a photomask image, the image parts of which contain a complex compound of a silver halide and a diazonium, pyrylium, or thiapyrylium salt, wherein said complex compound is substantially opaque to ultra-violet radiation an blue light but substantially transmitting visible light in the wavelength range above 500 nm.

4. A process for the preparation of a photomask image that is substantially opaque to ultraviolet radiation and blue light but substantially transmitting of visible light in the wave length range above about 500 nm by treating a photographic material, which contains in image-wise distribution a water-insoluble silver salt with an aqueous solution containing at least one salt of the group consisting of a diazonium salt, a pyrylium salt, and a thiapyrylium salt, whereby a complex is formed which is substantially opaque to ultraviolet and blue light and is substantially transparent to visible light of a wave length above about 500 nm.

4,004,926
FORMATION OF AZINE DYES

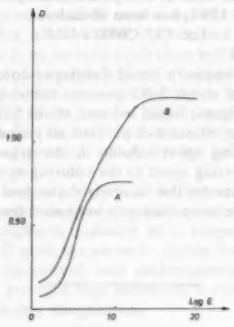
Jozef Frans Willems, Wilrijk, and Wilhelmus Janssens, Aarschot, both of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed Mar. 26, 1975, Ser. No. 562,114

Claims priority, application United Kingdom, Apr. 2, 1974, 14542/74

Int. Cl.² G03C *5/30*, *7/04*, *7/16*, *7/00*

U.S. Cl. 96—66 R **10 Claims**

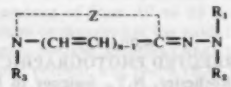


1. A method of producing a coloured image by developing a latent silver image obtained by the image-wise photo-exposure of a photosensitive silver halide material, wherein the development is carried out with p-phenylenediamine corresponding to the following general formula:

wherein:

each of R'_1, R'_2, R'_3, and R'_4 (same or different) represents an alkyl group, in the presence of

1. a hydrazone compound having the following general formula:



wherein:

n is 1, 2, or 3,

R_1 is hydrogen or an acyl group, and

R_2 is a $-CONH_2$ group or a $-SO_2H$ group, wherein X represents a hydroxyl group, an amino group, an aliphatic group, an aryl group or an heterocyclic group,

R_3 is an alkyl group or an aryl group, and Z represents the necessary atoms to close a nitrogen-containing heterocyclic nucleus, and

2. a colour of the phenol, naphthol, or active methylene compound series.

4,004,927
PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL CONTAINING LIQUID ORGANOPOLYSILOXANE

Nobuo Yamamoto; Kiyotaka Hori; Masakazu Yoneyama; Yasuhiro Nakayama, all of Minami-ashigara, and Akira Abe, Annaka, all of Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Feb. 3, 1975, Ser. No. 546,487

Claims priority, application Japan, Feb. 1, 1974, 49-13466

Int. Cl.² G03C *1/76*, *1/72*

U.S. Cl. 96—67 **14 Claims**

1. A photograhic light-sensitive material comprising a support having thereon at least one light-sensitive silver halide emulsion layer and with at least one photographic layer of the photographic light-sensitive material containing a liquid organopolysiloxane having therein at least one siloxane unit in which (1) a methyl group and (2) a member of the group consisting of an alkyl group, a cycloalkyl group, an alkoxyalkyl group, an aralkyl group, an aryloxyalkyl group or a 2,3-epoxypropyloxyalkyl group, each member of said group (2) having at least 5 carbon atoms, are attached to the silicon atom of the siloxane unit.

4,004,928
COLOR PHOTOGRAPHIC MATERIAL

Sadayuki Miyazawa, and Yoshikazu Takaya, both of Nagaokakyo, Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan

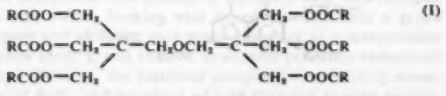
Filed Aug. 25, 1975, Ser. No. 607,546

Claims priority, application Japan, Aug. 28, 1974, 49-98567; Aug. 29, 1974, 49-98398

Int. Cl.² G03C *1/84*, *1/40*

U.S. Cl. 96—84 UV **9 Claims**

1. A color photographic material having a silver halide emulsion layer and a filter layer, there being present either one or both of (1) a non-diffusing oil-soluble color coupler in said silver halide emulsion layer; or (2) an ultraviolet ray absorber in said layer on a support, there being present in at least one of said silver halide emulsion layer and said layer at least one compound of the formula:



wherein R is an alkyl group of 1 – 8 carbon atoms as a perma-

nent solvent for said color coupler or said ultraviolet ray absorber.

4,004,929

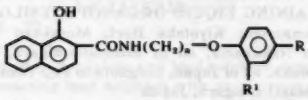
COLOR CORRECTED PHOTOGRAPHIC ELEMENTS

Roy L. Orvis, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

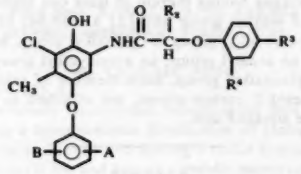
Continuation-in-part of Ser. No. 447,809, March 4, 1974, abandoned. This application Mar. 21, 1975, Ser. No. 561,019
Int. Cl.² G03C 1/40, 7/04
U.S. Cl. 96—100 **8 Claims**

1. In a photographic element comprising a support and at least one silver halide emulsion layer coated on said support and containing, incorporated in said layer (a) at least one naphtholic coupler capable of forming a cyan dye upon reaction with oxidized aromatic amino color developing agent, and (b) at least one colored coupler compound capable of forming a cyan dye upon reaction with said color developing agent;

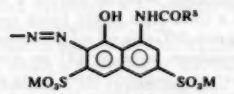
the improvement wherein said naphtholic coupler has the structure:



wherein R and R^1 are independently selected and are alkyl groups containing 1 to 8 carbon atoms and *n* is an integer from 1 to 6; and said colored coupler compound has the structure

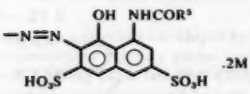


wherein R^2 is an alkyl group containing 1 to 6 carbon atoms, R^3 and R^4 are independently selected and are alkyl groups containing 2 to 6 carbon atoms, B is hydrogen or $COOR^6$ wherein R^6 is alkyl containing 1 to 8 carbon atoms and A is a sulfonated naphthylazo group selected from those having the structure:



(T)

or



(V)

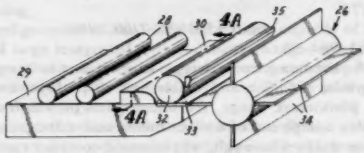
wherein R^5 is an alkyl group containing 1 to 4 carbon atoms, M is a photographically inactive monovalent cation.

4,004,930

FLUID COMPOSITION FOR FORMING RETROREFLECTIVE STRUCTURES

Chi Fang Tung, Mahtomedi, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed July 2, 1975, Ser. No. 592,744
Int. Cl.² C09D 5/00; G02B 5/12
U.S. Cl. 106—19 **10 Claims**



1. A fluid composition useful to prepare retro- reflective structures comprising:

1. a liquid vehicle that includes a transparent film-forming binder material; and
2. retroreflective platelet particles compatibly dispersed in said liquid vehicle comprising flat segments cut from a larger retroreflective sheeting; the shortest dimension of a face of the segments averaging at least about one-and-one-half times the thickness of the segments, and the segments including a monolayer of retroreflective elements optically exposed over at least one face of the segments; the index of refraction of said film-forming binder material being such that when said segments are embedded in said transparent film the retroreflective elements will retroreflect light incident on the film.

4,004,931

CONSTANT VISCOSITY INKS

Chin H. Lu, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 29, 1975, Ser. No. 581,986
The portion of the term of this patent subsequent to Sept. 23, 1992, has been disclaimed.
Int. Cl.² C09D 11/08
U.S. Cl. 106—30 **10 Claims**

1. A constant viscosity liquid developer composition comprising by weight about 3–35 percent coloring agent, about 25–90 percent organic liquid solvent, about 5–35 percent of a rosin ester binder, about 1–3 percent alkylated polyvinylpyrrolidone dispersing agent soluble in the organic liquid, the ratio of the dispersing agent to the coloring agent being about 5–15 percent whereby the viscosity varies less than about 20 percent when the temperature is increased from about 15° C to about 35° C.

4,004,932

ISOCYANATED POLYVALENT METAL SALTS OF OXIDIZED WAXES

Joseph O. Bienvenu, Longview, Tex., assignor to Petrolite Corporation, St. Louis, Mo.

Filed Dec. 20, 1974, Ser. No. 534,682
Int. Cl.² C09D 11/12, 11/06
U.S. Cl. 106—31 **18 Claims**

1. An isocyanated polyvalent metal salt of an oxidized non-benzenoid hydrocarbon wax characterized as follows:

1. Said wax having a melting point of 120°–230° F prior to oxidation;
2. Said wax having an acid number of about 5–20 and/or a saponification number of about 10–60 after oxidation.

4,004,933

PRODUCTION OF POROUS CERAMIC MATERIALS

Frank Ernest George Ravault, Birmingham, England, assignor to Foseco International Limited, Birmingham, England

Filed Dec. 20, 1972, Ser. No. 317,088

Claims priority, application United Kingdom, Jan. 14, 1972, 1929/72

Int. Cl.² C03C 3/22; B29H 7/22

U.S. Cl. 106—40 R 14 Claims

1. In the method of making a porous ceramic material which comprises impregnating a preformed organic foam structure with a slurry of finely divided ceramic material, and drying and firing the so impregnated foam, the improvement which comprises,

prior to impregnation of the foam with the slurry applying to at least a portion of the foam at least one liquid composition which penetrates the foam,

said liquid composition comprising a material selected from the group of agents which, when contacted by a component of the slurry, cause formation of a gel, whereby the material on contact with the slurry causes said finely divided ceramic material to adhere to the surface of the foam so as to form a thick coating on the foam, and

drying the foam prior to impregnation.

4,004,934

SINTERED DENSE SILICON CARBIDE

Svante Prochazka, Ballston Lake, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 409,073, Oct. 24, 1973, abandoned. This application Apr. 22, 1976, Ser. No. 679,207

The portion of the term of this patent subsequent to Dec. 10, 1991, has been disclaimed.

Int. Cl.² C04B 35/56

U.S. Cl. 106—44 23 Claims

1. A method of making a pre-shaped dense sintered silicon carbide ceramic article comprising the steps of:

a. forming a homogeneous dispersion of a submicron powder of

1. β-silicon carbide,

2. a boron containing compound in an amount equivalent to about 0.3–3.0% by weight of boron based on said silicon carbide, and

3. an elemental carbon source selected from the group consisting of elemental carbon and a carbonaceous additive in an amount equivalent to 0.1–1.0% by weight of elemental carbon based on said silicon carbide,

b. shaping the homogeneous dispersion into a green body substantially of the form of said desired final pre-shaped sintered article and of dimensions larger than those of said desired sintered article by the amount of sintering shrinkage, and

c. sintering the green body in an inert atmosphere chemically-inert with respect to silicon carbide at atmospheric pressure or below atmospheric pressure at a temperature of about 1900° –2100° C until the ceramic article has a density of at least 85% of theoretical, said carbonaceous additive being pyrolyzable to produce said elemental carbon at a temperature below sintering temperature.

4,004,935

GLAZING COMPOSITIONS FOR CERAMIC ARTICLES

Derek Grosvenor, Middlesbrough, and John Robert Frederick Nicholson, Stockton, both of England, assignors to Tioxide Group Limited, Billingham, England

Filed Nov. 14, 1974, Ser. No. 523,682

Claims priority, application United Kingdom, Dec. 1, 1973, 55803/73

Int. Cl.² C03C 5/02

U.S. Cl. 106—48 21 Claims

1. A substantially lead-free glazing composition capable of forming a glaze with a gloss of from 9–55 units measured at 45°, on ceramic articles when fired at a temperature of 950°–1200° C., comprising a finely—divided frit, an unfritted crystalline silica, water and optionally a clay, in which said frit comprises as essential ingredients silica (SiO_2) in an amount of from 25 to 55 mole percent, titanium dioxide (TiO_2) in an amount of from 7 to 20 mole percent, alkali metal oxides (M_2O) in an amount of from 10 to 25 mole percent, and strontium, calcium or magnesium (as oxide) in an amount of from 5 to 15 mole percent, alumina (Al_2O_3) in an amount of from 5 to 15 mole percent, and boron (B_2O_3) in an amount of from 0 to 10 mole percent, the amount of said unfritted crystalline silica being such that the silica content of the final glazing composition is increased from 5 to 28 weight percent (SiO_2) relative to the silica content of the frit.

4,004,936

LOW TEMPERATURE SEALED GLASS COMPOSITIONS AND PROCESS FOR THEIR PREPARATION

Jimmie Lee Powell, Wappingers Falls, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed May 19, 1976, Ser. No. 687,808

Int. Cl.² C03C 3/10, 3/12, 3/14

U.S. Cl. 106—53 4 Claims

1. A low temperature vitreous/crystalline seal glass composition consisting essentially of the following constituents in percent by weight:

	Percent by Weight
PbO	63.5–64.6
B_2O_3	13.0–13.9
Bi_2O_3	1.2–1.5
ZnO	11.4–11.9
SiO_2	2.4–2.8
Al_2O_3	0.8–1.0
Cu_2O	4.3–5.8

said composition having a softening temperature of from about 400° to 408° C, a glass transition temperature of from about 370° to 375° C, a strain temperature of from about 309° to 326° C, and annealing temperature of from about 332° to 342° C; and a thermal coefficient of expansion of from about 83×10^{-7}/° C to 86.5×10^{-7}/° C.

4,004,937

METHOD FOR PRODUCING A SINTERED SILICON NITRIDE BASE CERAMIC AND SAID CERAMIC

Hideyuki Masaki, Nagoya, Japan, assignor to Kabushiki Kaisha Toyota Chuo Kenkyusho, Nagoya, Japan

Division of Ser. No. 408,358, Oct. 23, 1973, Pat. No. 3,950,464. This application Nov. 18, 1975, Ser. No. 632,943

Claims priority, application Japan, Oct. 24, 1972, 47-106817

Int. Cl.² C04B 35/58, 35/02, 35/00; F27B 9/04

U.S. Cl. 106—59 2 Claims

1. A process of preparation of a silicon-nitride based ceramic, comprising the steps of combining at least one member of a first group consisting of MgO, ZnO and NiO, and at least one member of a second group consisting of Al_2O_3, Cr_2O_3, Y_2O_3, TiO_2 and SnO_2, all members being in powdered form, the mol ratio of said first group member or members to said second group member or members ranging from 1:9 to 9:1, heating said combined members to a temperature sufficient to form a spinel or spinel-like compound therefrom, cooling and grinding said compound to a fine powder, mixing said powdered compound with powdered Si_3N_4 in a mol ratio between 8:92 and 40:60, forming said mixed powders into a green compact and sintering said green compact at a temperature between 1600° C and 1800° C in an inert gas in the absence of applied pressure, the resultant composition consisting essentially of Si_3N_4 and members of said first and second groups, and all powders being finer than 300 mesh prior to heating.

4,004,938

METHOD AND APPARATUS FOR MANUFACTURING CEMENT CLINKER

Rudolf Rohrbach, Dotternhausen, and Horst Ritzmann, Enniger, both of Germany, assignors to Polysius AG, Neubeckum and Rudolf Rohrbach, Dotternhausen, both of, Germany

Filed Apr. 21, 1975, Ser. No. 569,832
Claims priority, application Germany, Apr. 25, 1974, 2420121
Int. Cl.² C04B 7/44
U.S. Cl. 106—100 11 Claims

1. A method of manufacturing cement clinker from limestone and clay components in a plant having a sintering kiln joined by a conduit to a multiple stage preheater having final and other interconnected stages, said method comprising introducing limestone components to a stage of said preheater other than said final stage; establishing via said conduit a stream of hot gases from said kiln to the final and other stages of said preheater to preheat said limestone components; introducing preheated limestone components from a stage of said preheater other than said final stage into said conduit; introducing fuel-bearing clay components into said conduit; combusting fuel in said fuel-bearing components in the presence of the preheated limestone components in said conduit to calcine the limestone and clay components; delivering the calcined limestone and clay components to the final stage of said preheater; discharging said calcined limestone and clay components from said final stage of said preheater to said kiln; and firing said calcined limestone and clay components in said kiln to form cement clinker.

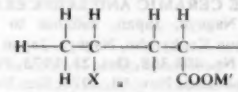
4,004,939

BISULFITE TERMINATED OLIGOMERS AS DISPERSING AGENTS

John T. O'Brien, Cheshire, and Woodrow W. White, Oxford, both of Conn., assignors to Uniroyal Inc., New York, N.Y.

Continuation-in-part of Ser. No. 456,397, March 29, 1974, abandoned. This application July 31, 1974, Ser. No. 493,382
Int. Cl.² C08H 1/00; C08L 3/00
U.S. Cl. 106—135 40 Claims

1. A method of dispersing insoluble solid particulate matter selected from the group consisting of inorganic pigments, extenders, and fillers in aqueous systems containing 25 to 85% by weight solid particulate matter comprising adding, in an amount effective to disperse the solid particulate matter, an oligomer having the formula:



wherein M is a water soluble cation; X is selected from —CN and —$COOCH_3$; M′ is based on a cation selected from the group consisting of ammonia, an amine, and an alkali metal; $a + b$ is from 4 to 250; and $a/a + b$ is from 0.0 to 0.6.

4,004,940

PIGMENTATION OF POLYMERS

Claude Cormier, Sherbrooke, Canada, assignor to Celanese Canada Limited, Montreal, Canada

Continuation-in-part of Ser. No. 403,150, Oct. 3, 1973, which is a continuation-in-part of Ser. No. 165,377, July 22, 1971, abandoned. This application Jan. 13, 1975, Ser. No. 540,629
Int. Cl.² C08J 3/00
U.S. Cl. 106—308 M 5 Claims

1. An improved polypropylene/pigment essentially dry-blended concentrate being a blend of isotactic polypropylene particles and at least one pigment coated on the particles, and wherein said pigment's concentration is 10–75% by weight, wherein the improvement comprises:

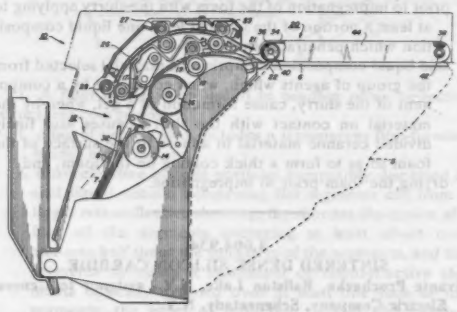
at least 95 weight percent of said polypropylene particles have a maximum chord of less than 50 microns, whereby fibers made therefrom have improved color, fewer pigment agglomerates and fewer broken filaments.

4,004,941

CLEANING METHOD FOR AUTOMATIC DOCUMENT HANDLER

Ronald M. Nekula, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Sept. 19, 1975, Ser. No. 615,010
Int. Cl.² B08B 3/08
U.S. Cl. 134—15 3 Claims



1. In a document handling process in which a platen belt transports a document to be copied onto a stationary exposure platen against a registration edge associated with the platen to register the document thereon, the improvement for treating the platen belt to minimize the variation in frictional characteristics between a dirty belt and a clean belt comprising the steps of:

cleaning the surface of the belt which contacts the document to be copied with a solvent; and,

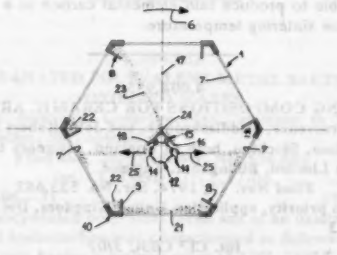
applying silicone oil to the cleaned surface of the belt in an amount sufficient to reduce the coefficient of friction of the cleaned surface to substantially the same coefficient of friction existing on the surface prior to said cleaning step.

4,004,942

PROCESS AND APPARATUS FOR CLEANING PARTICULATE MATERIALS

Gerard Yves Richard, Precy sur Oise, France, assignor to Societe d'Applications de Procedes Industriels et Chimiques S.A.P.I.C., France

Filed June 5, 1975, Ser. No. 584,138
Claims priority, application France, June 10, 1974, 74.19976
Int. Cl.² B08B 7/00
U.S. Cl. 134—25 R 5 Claims



1. A process for mechanically and pneumatically cleaning and stripping a particulate substance comprising introducing

particles of said substance into a current of gas under pressure, projecting said particles by means of said current of gas against the interior sides of a rotating drum from a fixed point adjacent the central axis of said drum, carrying the resultant particles upwardly in the direction of rotation of said drum, and allowing them to fall by gravity into said current of gas whereby they are intermittently and repeatedly subjected to shock treatment against the interior sides of said drum.

4,004,943

RECHARGEABLE ELECTROCHEMICAL CELL

Pieter Abraham Boter, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 20, 1975, Ser. No. 606,165

Claims priority, application Netherlands, Aug. 19, 1974, 7411045

Int. Cl.² H01M 35/02

U.S. Cl. 429—59 **4 Claims**

1. A rechargeable electrochemical cell having an electrode which consists of $La_{1-x}R_xNi_{5-z}M_zH_y$, where $y = 0$ to 1, $z = 0$ to 1, $x = 0$ to 7, R is a metal selected from the group consisting of the rare earth metals, calcium and thorium, and M is a metal selected from the group consisting of cobalt, copper and iron, in the presence of iron $z < 0.2$, a counterelectrode consisting of a material which is capable of reversibly taking up and giving off a proton and an electron and an electrolyte.

4,004,944

ELECTRODE MATERIAL FOR ACCUMULATORS AND OTHER ELECTROCHEMICAL SOURCES OF CURRENT

Josef Šandera; Milan Calábek; Miroslav Cenek, all of Brno; Vojtech Koudelka, Mlada Boleslav; Oldrich Kouřil, Brno; Jiri Malik, Mlada Boleslav, and Josef Vaňaček, Brno, all of Czechoslovakia, assignors to Prazska akumulatorka, narodni podnik, Mlada Boleslav, Czechoslovakia

Filed July 28, 1975, Ser. No. 599,421

Claims priority, application Czechoslovakia, July 30, 1975, 5419/75

Int. Cl.² H01M 35/02

U.S. Cl. 429—215 **4 Claims**

1. An improved active composition of a completed plastic-bonded electrode in an electrochemical current source, the composition consisting essentially of (1) a powdered base active material selected from the group consisting of cadmium, nickel, zinc and zinc oxide, (2) a binding agent, and (3) a substance selected from the group consisting of oxalic acid and a salt thereof, the last-mentioned substance being present in the composition in the range of 1.5–60% by weight.

4,004,945

BATTERY PLATE GRID

Carleton H. Smith, 34 North Drive, Islington, and Kenneth G. Dunning, 413 Vancouver Crescent, Oshawa, both of Canada

Continuation of Ser. No. 497,742, Aug. 15, 1974, abandoned. This application Feb. 6, 1976, Ser. No. 656,874

Int. Cl.² H01M 4/80

U.S. Cl. 429—244 **2 Claims**

1. A lead battery plate grid for a lead acid battery comprising a lead perimeter frame, a lead lattice network of intersecting bars formed integrally with and within said perimeter frame, protuberances spaced apart on one side only of said lattice network and formed integrally therewith, said perimeter frame having a greater thickness than said lattice network, the principal plane of said lattice network being between the spaced apart planes of opposed face surface of said perimeter frame, said protuberances on said one side of the said lattice network of said grid having a height of about ⅛ of the difference in thickness between said lattice network and said perimeter frame whereby the outer extremities of said protuberances are in the plane of one face surface of said frame.

4,004,946

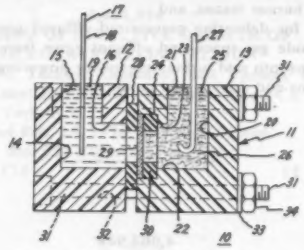
SEALED LITHIUM-CHLORINE CELL

Gregory C. Farrington, Elnora, and Walter L. Roth, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 517,513, Oct. 24, 1974, abandoned. This application June 23, 1975, Ser. No. 589,136

Int. Cl.² H01M 6/18, 8/10

U.S. Cl. 429—72 **5 Claims**



1. A sealed lithium-chlorine cell comprises a casing, an anode positioned within the casing, the anode selected from the class consisting of lithium, lithium as an amalgam and lithium in a non-aqueous electrolyte, a cathode positioned within the casing, the cathode comprising chlorine with an ionic conductivity enhancing material, and a solid lithium-sodium aluminate electrolyte positioned within the casing between the anode and cathode and in contact with both the anode and cathode, the solid lithium-sodium aluminate electrolyte having an approximate composition of $LiNaO \cdot 9Al_2O_3$ of which 1.3 to 85.0 percent of the total alkali content is lithium.

4,004,947

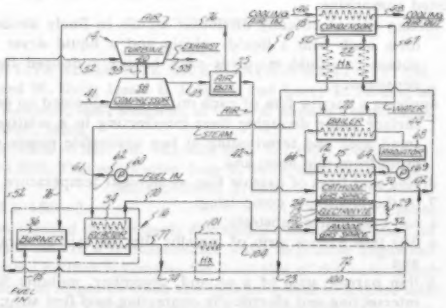
PRESSURIZED FUEL CELL POWER PLANT

David P. Bloomfield, West Hartford, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Feb. 12, 1975, Ser. No. 549,601

Int. Cl.² H01M 8/06

U.S. Cl. 429—17 **30 Claims**



1. A power plant for generating electricity comprising:
a fuel cell stack including a plurality of fuel cells connected electrically in series through a load, each cell comprising a cathode electrode, an anode electrode, an electrolyte

disposed therebetween, a cathode gas space on the nonelectrolyte side of said cathode electrode and an anode gas space on the nonelectrolyte side of said anode electrode;

compressor means including a compressor operably connected to turbine means;

means for delivering air at a pressure of at least two atmospheres from said compressor into said cathode gas space;

fuel conditioning apparatus including reactor means for producing hydrogen from a hydrogen containing fuel;

burner means for providing heat to said reactor means;

means for delivering pressurized hydrogen containing fuel into said reactor means;

means for delivering pressurized hydrogen from said fuel conditioning apparatus into said anode gas space;

means for delivering at least a first portion of said anode effluent gases into said burner means for providing fuel to said burner means; and

means for delivering pressurized effluent gases from said cathode gas space and effluent gases from said burner means into said turbine means for powering said turbine means and driving said compressor.

4,004,948

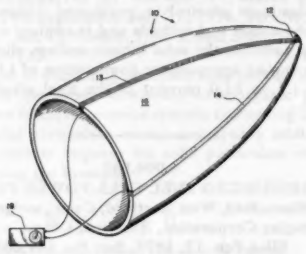
PAINT-ON THERMOCOUPLE

Warren K. Smith, Poway, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 29, 1975, Ser. No. 582,044

Int. Cl.² H01L 35/12

U.S. Cl. 136—201 **7 Claims**



1. The method of making a thermocouple on a surface to be tested comprising:

mixing two electrically dissimilar metals in finely divided form each with a liquid vehicle and a liquid dryer to obtain two fluid mixtures each having a desired fluid consistency;

applying a narrow film of each mixture so obtained on said surface along diverging lines intersecting in a relatively small area and terminating at two accessible points remote from said area; and

drying said lines of narrow film at ambient temperature.

7. A thermocouple comprising:

a non-conductive substrate;

a first thin narrow strip of metallic film on said substrate; and

a thin narrow strip of a second, dissimilar, metallic film intersecting and electrically contacting said first strip;

said first metallic film being a paint containing a finely divided metal selected from the group consisting of: silver, platinum, gold and lead; and

said second strip being a paint having a pigment consisting essentially of constantan.

4,004,949

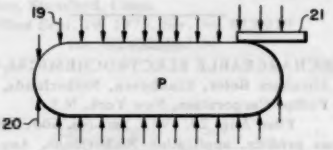
METHOD OF MAKING SILICON SOLAR CELLS

Israel Arnold Lesk, Scottsdale, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Filed Jan. 6, 1975, Ser. No. 538,848

Int. Cl.² H01L 21/265

U.S. Cl. 148—1.5 **9 Claims**



1. A method for making a silicon solar cell, which comprises:

providing a silicon substrate of a first conductivity type having first and second opposing surfaces and at least two opposing rounded edges joining said first and second surfaces,

ion implanting an impurity of a second conductivity type into one of said first and second surfaces of said silicon body to form a second conductivity type region extending from said one surface into said substrate and forming a P-N junction with said substrate which terminates at at least one of said rounded edges,

ion implanting an impurity of the first conductivity type into the other of said first and second surfaces to form a first conductivity type region having a greater doping level than said substrate extending from said other surface into said substrate and forming a boundary with said substrate extending into said substrate a sufficient extent to terminate against said at least one of said rounded edges and contact said P-N junction, and

forming electrical contacts to said first and second conductivity type regions.

4,004,950

METHOD FOR IMPROVING THE DOPING OF A SEMICONDUCTOR MATERIAL

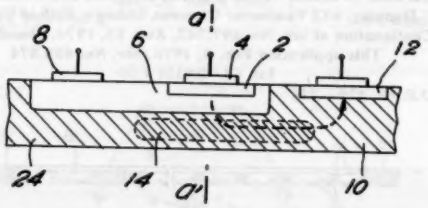
Pierre Baruch, Paris; Joseph Borel, Echirolles, and Joel Monnier, Antibes, all of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly and Commissariat a l'Energie Atomique, Paris, both of, France

Filed Jan. 10, 1975, Ser. No. 539,983

Claims priority, application France, Jan. 10, 1974, 74.00774

Int. Cl.² H01L 21/263

U.S. Cl. 148—1.5 **21 Claims**



1. A method for improving the doping of a semiconductor material with impurities of a given conductivity type, wherein said method consists in a first step in doping said material with said impurities which have a given concentration profile and, in a second step, in maintaining said material at a high temperature, in bombarding said material with a beam of a constant intensity of particles accelerated with a constant energy which

is sufficient to penetrate into the material during a given time interval so as to obtain migration of the impurities resulting in an increase in the impurity concentration irrespective of the sign of the initial concentration gradient within a zone adjacent to the zone of stopping of the particles, said zone being in a portion of said material which is doped with said impurity.

4,004,951

PROTECTIVE COATING FOR ALUMINUM PRODUCTS

Geoffrey A. Dorsey, Jr., Danville, Calif., assignor to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.

Continuation-in-part of Ser. No. 593,092, July 3, 1975, abandoned. This application Sept. 8, 1975, Ser. No. 610,966

Int. Cl.² C23F *7/00*

U.S. Cl. 148—6.27 **18 Claims**

1. A method of forming a tenacious, hydrophobic coating on an aluminum surface which is resistant to polar organic solvents comprising treating the aluminum surface with an alkaline solution at a pH less than 10 containing a compound which generates therein a long chain aliphatic carboxylate anion having from 10–20 carbon atoms and maintaining the temperature at the surface-solution interface greater than 60° C, the solution initially etching the aluminum surface and then the solution forming aa tenacious hydrophobic coating on the aluminum surface which is resistant to polar organic solvents.

4,004,952

CARBURIZED BEARING MEMBERS

Chester F. Jatczak; Jesse A. Burnett, both of North Canton, and Terry W. Mohr, Canton, all of Ohio, assignors to The Timken Company, Canton, Ohio

Division of Ser. No. 598,067, July 22, 1975, Pat. No. 3,954,517. This application Jan. 23, 1976, Ser. No. 651,815

Int. Cl.² C22C *38/44*, *38/46*

U.S. Cl. 148—39 **3 Claims**

1. A machine element formed from a carburized steel alloy having a surface hardness of at least Rockwell C58 and consisting essentially of about 0.1 to 0.3% carbon, 0.2 to 1% manganese, 0.2 to .6% silicon, from an effective amount up to 1.2% chromium, 2.5 to 3.5% nickel, 4 to 6% molybdenum, 0.25 to 0.85% vanadium and the remainder substantially all iron, the hot twist characteristics of said alloy being such that it can experience at least 40 twists to fracture at temperatures of 1800° F and above.

4,004,953

METHOD FOR GROWING CRYSTALS OF III-V COMPOUND SEMICONDUCTORS

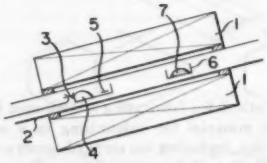
Mutsuyuki Otsubo; Hidejiro Miki, and Kiyoshi Shirahata, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Sept. 23, 1975, Ser. No. 615,882

Claims priority, application Japan, Oct. 7, 1974, 49-115367

Int. Cl.² H01L *21/208*

U.S. Cl. 148—172 **6 Claims**



1. A method for growing semi-insulating Group III–V compound semiconductor crystals having a residual free electron concentration of 10^{15} cm^{-3} or less, on a substrate by means of an epitaxially crystallizing process in a liquid state, which comprises the steps of:

a. placing a boat containing a saturated solution of a III–V compound having chromium added therein in an inclined reaction tube;

b. heating the solution at a temperature of 800° – 950° C in an atmosphere of hydrogen;

c. cooling the reaction tube to room temperature and placing a substrate in said boat without permitting the substrate to come into contact with the solution, while another boat having a V Group element vapor-generating solution thereon is inserted in said reaction tube;

d. heating the reaction tube at a temperature of 700° to 900° C, and bringing the saturated solution of III–V compound into contact with the substrate by reversing the inclination of the reaction tube; and

e. slowly cooling the system to grow a crystal of the III–V compound on the substrate at a temperature of 700° – 830° C.

4,004,954

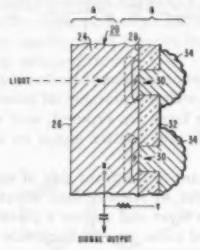
METHOD OF SELECTIVE GROWTH OF MICROCRYSTALLINE SILICON

Donald Richard Tshudy, Lancaster, and Thomas William Edwards, Mount Joy, both of Pa., assignors to RCA Corporation, New York, N.Y.

Filed Feb. 25, 1976, Ser. No. 661,400

Int. Cl.² H01L *21/205*, *31/14*

U.S. Cl. 148—174 **12 Claims**



6. A method of selective growth of microcrystalline silicon on an array of discrete surface regions of a silicon wafer exposed through an array of openings in a layer overlying said wafer, the method including the steps of:

a. preheating the wafer and overlying layer to a temperature above 1000° C. in an enclosed chamber in a continually renewed atmosphere comprising hydrogen for at least one minute; and thereafter,

b. selectively growing mircrocrystalline silicon on the discrete surface regions of the silicon wafer by the hydrogen reduction of silicon tetrachloride at a temperature below said preheat temperature.

4,004,955

POSITIVE SELECTIVE NICKEL ALIGNMENT SYSTEM

Richard W. Dost; James L. Hudson, and Larry L. Jordan, all of Kokomo, Ind., assignors to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 363,488, May 24, 1973, Pat. No. 3,914,050. This application June 9, 1975, Ser. No. 585,343

Int. Cl.² H01L *21/306*

U.S. Cl. 156—3 **2 Claims**

2. A method of selectively depositing a metallic coating on the back side of a semiconductor wafer in precise alignment with mesa emitter regions on the front side of the wafer using a pattern of ridges between said emitter mesas to acquire said alignment, said method comprising the steps of:

forming a pattern of ridges on a front side of a semiconductor wafer between said emitter mesas;

forming a silicon dioxide layer on the back side of said semiconductor wafer;

applying a layer of photoresist coextensive with and contiguous said silicon dioxide layer;

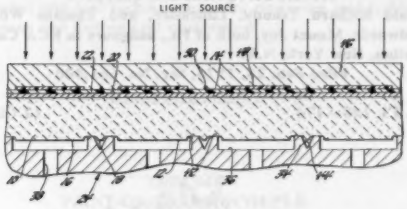
aligning a photomask with a distinctive alignment chuck, said chuck having at least one major face having a plurality of recesses complementary to said emitter mesas, grooves in said face between said recesses which precisely correspond with said pattern of ridges on said wafer, said grooves having a width and depth slightly greater than the width and height of said ridges;

nesting said pattern of ridges of said semiconductor wafer in said alignment chuck grooves thereby aligning said wafer with said chuck and automatically registering said photomask with selected regions on the back side of the wafer;

abutting said photomask with said photoresist layer on said back side of said semiconductor wafer whereby said photomask is in positive alignment with said emitter mesas on the front side of said wafer;

exposing said photoresist layer with said photomask thereon to an ultraviolet light;

removing said wafer;



developing said photoresist to form windows in said photoresist layer in which a plurality of selected areas of said silicon dioxide layer are exposed, said windows being in alignment with said emitter mesas on said front side of said wafer;

applying a maskant to the front side of said wafer;

etching said wafer to remove said selected areas of said silicon dioxide layer and expose a plurality of underlying silicon selected areas on said back side of said wafer.

removing said photoresist;

electrolessly plating a nickel coating on said selected areas on said back side of said wafer to form a plurality of discrete low resistance electrical contacts for each device included in said wafer, said nickel contacts being in precise alignment with said emitter mesas on the front side of said wafer; and

separating a plurality of individual mesa devices from said wafer by etching completely through portions of said wafer not coated with said nickel whereby said nickel does contaminate exposed PN junctions of the devices.

4,004,956

SELECTIVELY STRIPPING TIN OR TIN-LEAD ALLOYS FROM COPPER SUBSTRATES

Frank A. Brindisi, Jr., Madison, Conn., assignor to Enthone, Incorporated, West Haven, Conn.

Filed Aug. 14, 1974, Ser. No. 497,435

Int. Cl.² C09K *13/08*

U.S. Cl. 156—666 **20 Claims**

1. In an acidic aqueous solution for selectively stripping tin or tin-lead alloy solder from a copper substrate comprising a nitro-substituted aromatic compound having at least one $-NO_2$ group attached to the aromatic ring and a water-solubilizing substituent also attached to the aromatic ring, an inorganic acid capable of reacting with tin and lead to form water-soluble salts thereof and incapable of reacting with tin and lead to form a water-insoluble compound film, a thiourea for preventing redeposition of stripped tin onto the copper substrate, and an organic acid of the formula RCOOH wherein R is 1–2C alkyl or a hydrogen atom, the improvement whereby a more rapid stripping of the tin or tin-lead alloy solder from the copper is provided, which comprises having present in the aqueous solution an effective amount of a haloacetic acid wherein the halo is chloro or bromo, the amount of said haloacetic acid being sufficient, in combination with said acid of the formula RCOOH wherein R has the meaning aforesaid, to synergistically accelerate the rate of stripping of the tin or tin-lead alloy solder from the copper substrate.

4,004,957

METHOD FOR ETCHING SILICON

Leo J. Quintana, Orange, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Division of Ser. No. 599,910, July 28, 1975. This application June 14, 1976, Ser. No. 695,686

Int. Cl.² H01L *7/50*

U.S. Cl. 156—643 **6 Claims**

1. A method of selectively etching silicon comprising the steps of:

depositing a layer of positive photoresist material upon said silicon;

defining in said photoresist material the portions of the silicon which are to be protected from etching; and

exposing the unprotected portions of the silicon to an etchant for a period of time which is sufficient to remove a desired quantity of silicon, said etchant comprising between 20 and 95 percent by volume nitric acid, between 80 and 5 percent by volume fluoboric acid and up to about 2 grams of ammonium fluoborate per liter of the etchant.

4,004,958

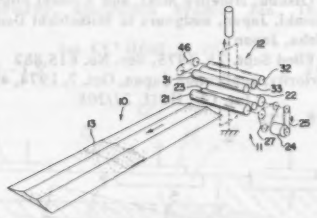
METHOD AND APPARATUS FOR PRODUCING BETTER BALANCED TREAD COMPONENTS IN PNEUMATIC TIRES

Billy Joe Jones; Donald James Linnstaedter, and Freydoun Monajjem, all of Waco, Tex., assignors to The General Tire & Rubber Company, Akron, Ohio

Filed Aug. 15, 1975, Ser. No. 605,105

Int. Cl.² B29H *17/20*

U.S. Cl. 156—128 R **6 Claims**



1. In a method for fabricating a laminated band of uncured elastomeric material for vulcanizing in a mold, to form a pneumatic tire, including the steps of constructing a carcass of superposed plies and applying thereto a cut-to-length extruded vulcanizable strip that is wrapped around the carcass and lap spliced at its ends, the improvement which comprises:

before said strip is applied to said carcass, longitudinally shortening said strip to form a thickened portion midway between the ends thereof

whereby when said strip is applied to said carcass and said

laminated band is vulcanized, said thickened portion is located 180° from the zone of the splice to counterbalance the extra weight of said splice zone.

4,004,959

UNSATURATED POLYESTER WITH POLYIMIDE-AMMONIA PREPOLYMERS AS THERMOSETTING LAMINATE

Pierre Ledru, Lyon, France, assignor to Rhone-Poulenc Industries, Paris, France

Filed Feb. 13, 1975, Ser. No. 549,788

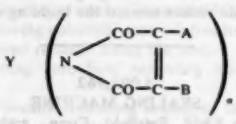
Claims priority, application France, Feb. 15, 1974, 74.05209

Int. Cl.² C09J 3/02; C08L 67/06, 77/00

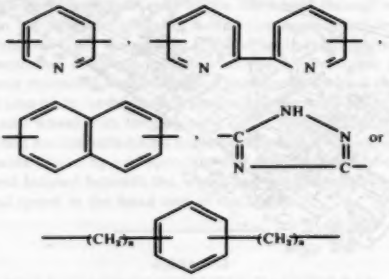
U.S. Cl. 156—331 **8 Claims**

1. A thermosetting composition which comprises:

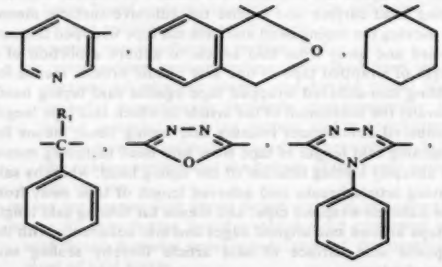
a. a prepolymer possessing imide groups, with a softening point from 50° to 200° C., prepared by reacting ammonia with a polyimide of the formula:



in which *a* is a number ranging from 2 to 4, Y represents an organic radical of valency *a* selected from a linear or branched alkylene radical with 2 to 12 carbon atoms, a phenylene radical, a cyclohexylene radical, one of the radicals of the formulae:



wherein *n* represents an integer from 1 to 3, a radical consisting of phenylene or cyclohexylene radicals bonded to one another either directly or by an atom or group selected from —O—, —S—, an alkylene group with 1 to 3 carbon atoms, —CO—, —SO_2—, —CONH—, —COO—, —P(O)R^1—, —CONH—X—NHCO—,



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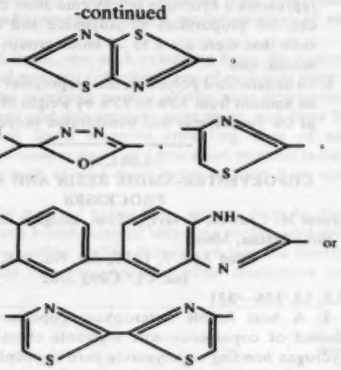
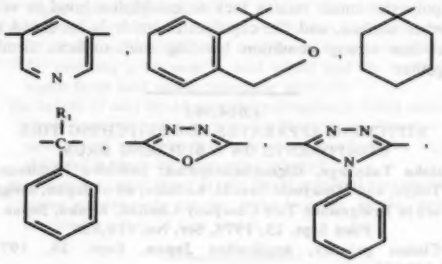
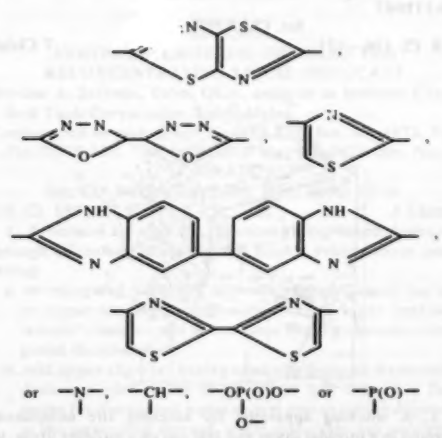


wherein R^1 represents a hydrogen atom or an alkyl radical with 1 to 4 carbon atoms, a phenyl radical or a cyclohexyl radical, and X represents an alkylene radical with 2 to 12 carbon atoms, said phenylene and cyclohexylene radicals optionally being substituted by methyl groups or a tri- or tetra-valent radical, the valencies of which are carried by a benzene type nucleus, optionally substituted by methyl groups, a naphthalene-type nucleus, a pyridine-type nucleus or a triazine-type nucleus or several benzene nuclei bonded to one another by a valency bond or by an inert atom or group selected from —O—, —S—, an alkylene group with 1 to 3 carbon atoms, —CO—, —SO_2—, —CONH—, —COO—, —P(O)R^1—, —CONH—X—NHCO,





or —N—, —CH—, —OP(O)O— or —P(O)—
| | | O— |

and each of A and B, which may be identical or different,

represents a hydrogen or chlorine atom or a methyl radical, the proportions of polyimide and ammonia being such that there are 2 to 20 imide groups per mol of ammonia; and

b. an unsaturated polyester, the prepolymer being present in an amount from 35% to 95% by weight of the total weight of the prepolymer and unsaturated polyester.

4,004,960

COPOLYESTER-AMIDE RESIN AND ADHESIVE PROCESSES

Ernest M. Crowell, Beverly, Mass., assignor to USM Corporation, Boston, Mass.

Filed Apr. 7, 1975, Ser. No. 565,598
Int. Cl.² C09J *3/02*
U.S. Cl. 156—331 **9 Claims**

1. A heat fusible heterophase copolyester-amide resin formed of copolyester soft segments chemically joined to hydrogen bonding copolyamide hard segments having limited compatibility with the copolyester soft segments in which said copolyester segments comprise from about 30 to about 60% of aliphatic ester components and from about 70 to about 40% of aromatic ester components, said copolyester segments have a molecular weight of from about 5,000 to about 15,000, and in which the total amide structure in said copolyesteramide constitutes by weight from about 5 to about 40% based on the weight of said copolyester-amide and amide structure from aminolysis of said copolyester constitutes from about 40 to about 70% by weight of said total amide structure.

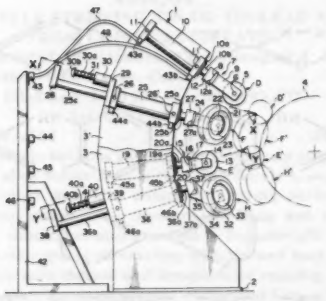
7. An adhesive process in which a copolyester-amide resin as defined in claim 1 is melted and deposited in molten condition on a surface to be bonded, the deposited adhesive is cooled below the crystallization temperature of the polyamide segments, a further surface is pressed against the deposited copolyester-amide during the period within which the polyester segments remain mobile so that the deposited copolyester-amide retains tack to establish a bond to said further surface, and the copolyester-amide is hardened to tack-free strong condition bonding said surfaces firmly together.

4,004,961

STITCHING APPARATUS FOR STITCHING TIRE COMPONENTS ON A BUILDING DRUM

Yutaka Takasuga, Higashimurayama; Seiichiro Nishimura, Tokyo, and Masayoshi Suzuki, Kodaira, all of Japan, assignors to Bridgestone Tire Company Limited, Kyoba, Japan

Filed Sept. 25, 1975, Ser. No. 616,888
Claims priority, application Japan, Sept. 26, 1974, 49-111082
Int. Cl.² B29H *17/08*
U.S. Cl. 156—421 **7 Claims**



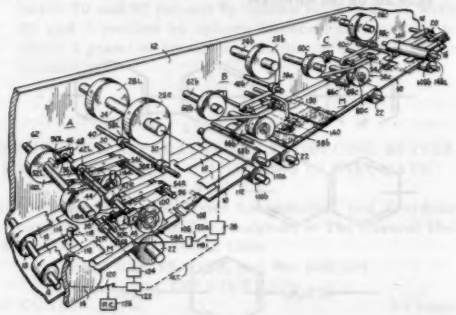
1. A stitching apparatus for stitching tire components formed in a toroidal shape and laid out on a building drum, the apparatus comprising: a frame structure arranged opposingly to and spaced apart from the drum; a central roller disposed opposingly to a mid-circumferential plane of the drum and having a rotational aixs parallel with that of the drum for stitching mid-circumferrential portions of the tire components on the drum, said central roller being made of metal in a generally cyclindrical shape; at least one pair of side rollers circumferentially spaced apart from said central roller and arranged symmetrically to the mid-circumferential plane of the drum for stitching side portions of the tire components, said side roller having a rotational axis inclined to that of the drum, to urge perpendicularly against the tire components, and being constituted of a pneumatic tire roller; a roller urging mechanism including two urging means mounted on said frame structure in radical relation with the rotational axis of the drum and having respective leading ends rotatably carrying thereon said central roller and said side rollers for alternatively projecting and retracting said rollers toward and away from a circumferential surface of the drum to stitch the tire components from their mid-circumferential portions to their side portions; and a roller urging pressure control mechanism for controlling the urging pressures of said side rollers exerted onto the side portions of the tire components on the drum in cooperation with said roller urging mechanism upon movement of said side rollers toward the building drum.

4,004,962

SEALING MACHINE

Robert Eugene Kleid, Fairfield, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn.

Filed June 9, 1975, Ser. No. 584,872
Int. Cl.² B32B *31/00*
U.S. Cl. 156—475 **8 Claims**

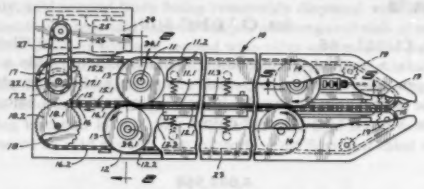


1. Apparatus for sealing an article of folded sheet material having opposite side surfaces and a pair of substantially aligned edges to be sealed, which comprises: means for moving said article along a predetermined path of travel; tape applying means including a rotatable taping head; said taping head having a substantially cylindrical surface which is normally spaced from said article; a supply of sealing tape having a non-adhesive major surface and an adhesive major surface; means for partially wrapping said sealing tape on said taping head to dispose the non-adhesive surface in contact with the taping head surface and expose the adhesive surface; means for moving the taping head and thus the tape wrapped thereon toward and away from said article to adhere a portion of a length of wrapped tape to one side of said article; means for holding non-adhered wrapped tape against said taping head, whereby the movement of the article to which said tape length is adhered commences rotating said taping head; means for detaching said length of tape from said head including means for abruptly halting rotation of the taping head, whereby said moving article breaks said adhered length of tape away from non-adhered wrapped tape; and means for folding said length of tape around said aligned edges and into adherence with the opposite side surface of said article thereby sealing said aligned edges.

4,004,963
BAND WHEELS AND DRIVE THEREFOR IN BAND SEALER

Stanley D. Denker, New Richmond, Wis., assignor to Domain Industries, Inc., New Richmond, Wis.

Filed Dec. 3, 1975, Ser. No. 637,293
Int. Cl.² B32B 31/00
U.S. Cl. 156—583 4 Claims



1. In a band sealer, a frame plate having a slot through which the bag top passes for sealing;

a pair of bag conveyor chains immediately above the frame plate and having conveyor runs confronting each other in closely spaced relation along the slot;

means including sprockets mounting and driving such chains;

heat transfer means producing sealing of the bag tops carried by the chains and including a pair of endless heat transfer bands located adjacent and above the chains and having heat transfer runs in confronting and closely spaced relation along the conveyor runs of the chains; and

means including wheels mounting and driving such bands, one wheel for each band overlying the adjacent chain in closely spaced relation and there being an open and unobstructed space next above the wheel through which an entire band may be moved for application to and removal from the wheels and also including a stationary mounting for the wheel and affixed to the frame plate, said mounting being disposed between the wheel and the frame plate, and coupling means directly connecting each band wheel with the adjacent conveyor chain, said coupling means including a sprocket meshed with said chain, gears driven by said sprocket and driving the band wheel and located beneath the wheel and producing the identical speed in the band and in the chain.

4,004,964
MULTISTAGE CONTINUOUS VACUUM PAN

Joseph Christophe Victor Ducasse, Papaaloa, Hawaii, assignor to Unice Machine Company, San Francisco, Calif.

Filed Apr. 18, 1974, Ser. No. 462,080
Int. Cl.² B01D 1/26, 1/00; F28F 9/22
U.S. Cl. 159—17 C 8 Claims

1. A pan for the continuous boiling of liquid materials having vaporizable constituents therein, said pan comprising:

a closed vessel divided into a plurality of successive stages;

each said stage comprising:

a lower liquid material receiving section separated from similar sections of adjacent stages;

an upper vapor collecting section; and

an intermediate heating section, separated from similar sections of adjacent stages, and having plural liquid material passageways vertically communicating said liquid material receiving section and a concentrated liquid material collecting zone lying between the top of the heating section and the bottom of the vapor collecting section;

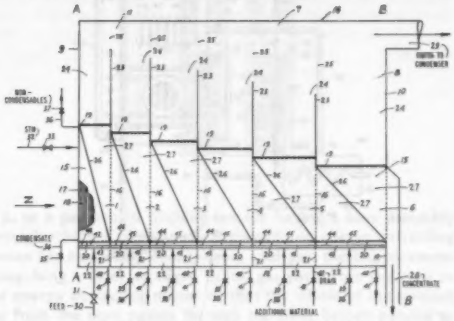
means for heating said plural liquid material passageways;

means for introducing liquid material to be processed into said liquid material receiving section of the upstream-most of said stages;

means for removing processed material from said vessel, from a discharge end of the downstream-most of said stages;

a plurality of ducts, one each extending from the concentrated liquid material collecting zone of each said stage to the material receiving section of the next downstream stage, except said downstream-most stage, and from the concentrated liquid material collecting zone of said downstream-most stage to said processed material removing means, each of said ducts being isolated from each other;

whereby liquid material passes from stage to stage by moving from each liquid material receiving section upwardly through the heating section thereabove into the concentrated liquid material collecting zone thereabove and



through one of said ducts to the liquid material receiving section of the next downstream stage, said liquid material being boiled in each said heating section, and vapor resulting from such boiling being collected in each said vapor collecting section;

means connected to said vessel and in communication with all of said vapor collecting sections as a common section for creating a vacuum in said vessel and for removing vapor from said vapor collecting sections;

the height of said liquid material passageways being successively lower stage-by-stage in the downstream direction of said vessel, whereby the hydrostatic head of the liquid material is stage-by-stage reduced; and

the cross-sectional areas of said liquid material passageways being successively greater stage-by-stage in the downstream direction of said vessel.

4,004,965
VERTICAL FLAMELESS REBOILER FOR RECONCENTRATING LIQUID DESICCANT

Morden A. Jackson, Tulsa, Okla., assignor to Maloney-Crawford Tank Corporation, Tulsa, Okla.

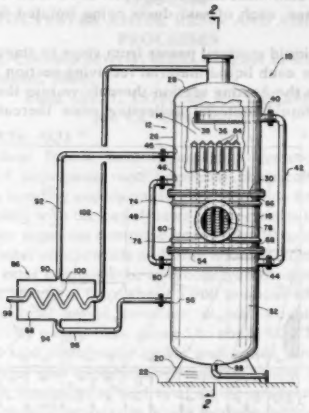
Continuation-in-part of Ser. No. 216,831, Jan. 10, 1972, Pat. No. 3,975,229. This application May 24, 1976, Ser. No. 689,638
Int. Cl.² B01D 1/00; F22D 1/00; B01D 53/02
U.S. Cl. 159—27 R 6 Claims

1. A vertical reboiler for reconcentrating liquid desiccant through utilization of exhaust gas from a prime mover comprising:

a. an elongated vertically disposed enclosed vessel having an upper enclosed reboiler chamber, a lower enclosed reboiler chamber and an enclosed heating chamber interposed therebetween.

b. said upper chamber having centrally disposed water-rich-desiccant inlet means at the upper end thereof, a first outlet for disengaged water vapors also centrally disposed at the upper end thereof, water-rich-desiccant receiving tray disposed below the inlet means and above the liquid desiccant contained in the upper chamber, first down-

comer means disposed outside the housing, the ends thereof being in open communication with the receiving tray and the lower chamber, second outlet spaced below the receiving tray for removing heated water-lean-desiccant, second downcomer means disposed outside of the housing connecting the lower portion of the upper chambers to the lower chamber for recirculation of the dessicant.



c. a plurality of spaced apart open-ended riser conduits vertically disposed and carried by the heating section, the lower ends thereof in communication with the upper portion of the lower chamber and the upper ends extending into the upper drum above the said second outlet.

d. said heating chamber enveloping the lower portion of said riser conduits for convection heating of the desiccant within the risers, and having exhaust gas inlet means on one side thereof and oppositely disposed exhaust gas outlet means.

4,004,966

FUME CONTROL FOR SULFUR DIOXIDE AMMONIA ABSORPTION SYSTEMS

Robert E. Matty, and Stephen S. Strom, both of Alliance, Ohio, assignors to The Babcock & Wilcox Company, New York, N.Y.

Filed Dec. 19, 1974, Ser. No. 534,498

Int. Cl.² D21C *11/12, 11/14*; C01B *17/00*

U.S. Cl. 162—30 R **5 Claims**

1. A fume free method of recovering chemicals useful in forming a digesting cooking liquor from an ammonia base cooking liquor pulping process of cellulosic materials wherein a residual waste liquor is formed comprising:

combusting the waste liquor to form a flue gas containing sulfur dioxide;

cooling the flue gas;

passing the cooled flue gas through a plurality of absorbing zones, while

contacting the gas with an aqueous solution of ammonium monosulfite-bisulfite of pH not in excess of 5.9 pH units;

adding ammonia to the aqueous solution in each of the said absorbing zones while maintaining the pH of the aqueous solution at no greater than 5.9 pH units; and

separating the aqueous solution from the flue gas for use in forming the cooking liquor.

4,004,967

BLEACHING CELLULOSE PULP WITH OXYGEN IN THE PRESENCE OF FORMALDEHYDE

Brita Swan, and Rune Gustavsson, both of Saffle, Sweden, assignors to Billeruds Aktiebolag, Saffle, Sweden

Continuation of Ser. No. 521,873, Nov. 7, 1974, abandoned, which is a continuation of Ser. No. 370,608, June 18, 1973, abandoned. This application July 2, 1975, Ser. No. 592,510

Claims priority, application Sweden, June 22, 1972, 8288/72

Int. Cl.² D21C *9/10*

U.S. Cl. 162—65 **10 Claims**

1. In a method for bleaching alkaline cellulose pulp with oxygen, the improvement which comprises adding formaldehyde to the pulp during the bleaching process in an amount from 3 to 30 kg per ton of pulp.

4,004,968

CONSECUTIVE MULTI-PLY FORMERS WITH AN UNENCUMBERED DOFFER FELT

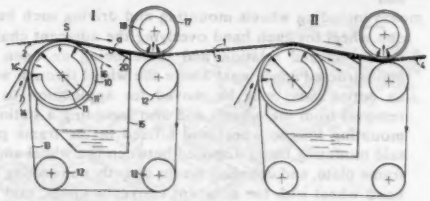
Heinz Braun; Hans Dahl, both of Ravensburg; Jost Hefter, Fenken, and Wolf-Gunter Stotz, Ravensburg, all of Germany, assignors to Escher Wyss G.m.b.H., Ravensburg, Germany

Continuation of Ser. No. 423,121, Dec. 10, 1973, abandoned. This application May 27, 1975, Ser. No. 580,774

Claims priority, application Switzerland, Dec. 11, 1972, 17971/72

Int. Cl.² D21F *1/04, 1/40, 1/50, 11/08*

U.S. Cl. 162—304 **4 Claims**



1. A paper machine comprising

a plurality of consecutively disposed formers, each former including a breast box, a suction breast roll and at least one suction box in said roll for dewatering a paper web formed by said former under negative pressure;

a doffer felt extending between said formers over each said suction breast roll of each former in unencumbered fashion;

a plurality of guide rolls about each said former; and

a long wire extending about each said breast roll and the related guide rolls, said wire having a portion extending along said doffer felt to dispose the formed paper web therebetween.

4,004,969

PAPER MACHINE DRAINAGE FOIL WITH WEAR-RESISTANT INSERT

Norman J. Beauchemin, Shrewsbury, Mass., assignor to Lodding Engineering Corporation, Auburn, Mass.

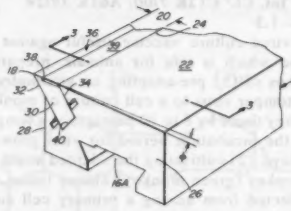
Filed Nov. 5, 1975, Ser. No. 629,024

Int. Cl.² D21F *7/00*

U.S. Cl. 162—352 **7 Claims**

1. For use in a paper machine having a traveling screen for supporting water-wet pulp during the drainage of water therefrom, an elongated drainage foil intended to extend lengthwise transversely under the full width of the screen and having a leading edge for initial contact with said screen, followed in the direction of travel of the screen by an upward-facing land surface in supporting relation thereto, followed in said direc-

tion of travel by a drainage surface diverging from the underside of the screen to control the drainage of water from said pulp, the improvement in said foil comprising, a first body defining said drainage surface and a second body defining all of said land surface from said leading edge to said drainage surface, said land surface being covered at least in part with a wear-resistant material that is permanently affixed to said second body and is harder than the material of said second body, an elongated channel running the length of the first body, said second body being removably disposed within said channel wherein said second body is an elongated slab of solid material having first and second wide sides substantially parallel to each other, and a third side joining the first side at an acute angle and joining the second side at an obtuse angle, said land surface being on said third side, said second body being installed in said first body with said first side oriented forward of said second side whereby said first and third surfaces meet at said acute angle to form the leading edge of said drainage foil, and said second and third surfaces meet at a line that coincides substantially with the forward edge of said drainage surface, said elongated channel in said first body has first and second side walls and a bottom wall and an elongated opening into the channel between the edges of said first and second side walls that are remote from said bottom wall, and first and second auxiliary slots extending in opposite directions, respectively, substantially perpendicularly into said first and second side walls, and having retainer means on said second body extending, respectively, from said first and second wide sides into said first and second auxiliary slots to retain said second body in said channel against force oriented to move said second body out of said channel through said elongated opening, and said retainer means comprises an array of discrete projections spaced in a line along each of said first and second wide sides.



4,004,970

RADIATION SOURCE FOR MOSSBAUER INVESTIGATIONS OF TELLURIUM COMPOUNDS AND METHOD OF PREPARING SAME

Anatoly Julianovich Alexandrov, ulitsa Butlerova, 10, kv. 112, Moscow; July Sergeevich Grushko, ulitsa Koli Podryadchikova, 16, kv. 40, Gatchina Leningradskoi oblasti; Evgeny Fredovich Makarov, Trubnikovsky pereulok, 11, kv. 3, Moscow; Konstantin Yakovlevich Mishin, ulitsa Kurgetova, 23, kv. 73, Gatchina Lenigradskoi oblasti, and Daljus Antanas Jono Baltrunas, ulitsa Zhirmunu, 17, kv. 27, Vilnjus Litovskoi, all of U.S.S.R.

Filed Mar. 3, 1975, Ser. No. 554,705
Int. Cl.² G21E *1/10*
U.S. Cl. 176—16 **2 Claims**

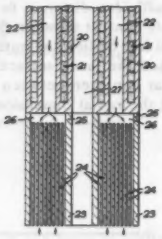
1. A method of preparing a radiation source for Mossbauer investigations of tellurium compounds comprising the steps of: irradiating $5MgO.Te^{124}O_3$ with thermal neutrons in a reactor to obtain $5MgO.Te^{125m}O_3$; annealing the $5MgO.Te^{125m}O_3$ at a temperature ranging from 600° to 1,100° C for a period of from 5 to 10 hours; and then gradually cooling the annealed $5MgO.Te^{125m}O_3$ to room temperature.

4,004,971

GAS COOLED NUCLEAR REACTORS

David Vernon Freck, Stroud, and John Anthony Hall, Thornbury, both of England, assignors to Central Electricity Generating Board, London, England

Filed Aug. 19, 1974, Ser. No. 498,565
Claims priority, application United Kingdom, Aug. 21, 1973, 39392/73
Int. Cl.² G21C *5/00, 9/32*
U.S. Cl. 176—37 **7 Claims**



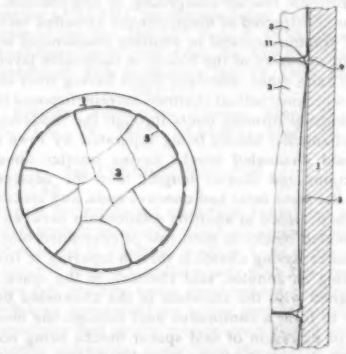
1. In a gas cooled nuclear reactor having a core assembly through which a coolant gas is passed and energy extracting means for extracting energy from said gas; the improvement comprising a filter arranged in the gas path from the core to the energy extracting means so that the whole of the coolant gas from the core passes through the filter before passing to said energy extracting means, which filter comprises a graphite body having a plurality of holes therein with a hydraulic diameter between 1 and 6 mm and a ratio of length to hydraulic diameter between **170** and **1000**, said holes providing passages for the coolant gas leaving the reactor core.

4,004,972

NUCLEAR FUEL ELEMENT

Johan Hilding Mogard, Lidingo, Sweden, assignor to Aktiebolaget Atomenergi, Stockholm, Sweden

Filed Jan. 30, 1974, Ser. No. 437,871
Claims priority, application Sweden, Feb. 2, 1973, 7301524
Int. Cl.² G21C *3/18*
U.S. Cl. 176—81 **8 Claims**



1. Nuclear fuel element for use in power producing nuclear reactors, comprising an axially elongated cladding tube or metal or metal alloy, a plurality of axially aligned cylindrically shaped solid bodies of the sintered oxide type which undergo fracturing under power operation into a number of fragments separated by crack paths which characteristically extend radi-

ally and remain open in the peripheral region of said fuel bodies, wherein the improvement comprises means for improving the heat-transfer between said fuel bodies and said cladding tube and for minimizing the creation of stress concentration in the wall of the cladding tube in that said cladding tube has a cylindrically shaped inner surface, at least 8 axially extending mutually parallel circumferentially spaced ribs formed on and extending radially inwardly from the cylindrically shaped inner surface, the radial dimension of said ribs inwardly from the cylindrically shaped inner surface of said cladding tube being at most about 0.05 mm and said ribs being spaced apart a sufficient distance to avoid coincidence of cracks and intimate contact between the inner surface of said cladding tubes and fuel bodies, the outer cylindrical surface of said fuel bodies and the inner surface of said cladding tube forming an annular gap therebetween having a width in the range from about the radial dimension of said ribs to about 0.15 mm.

4,004,973

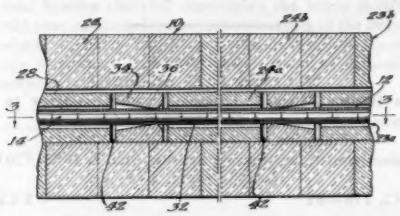
NEUTRONIC REACTOR

John T. Carleton, Elsmere, Del., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Aug. 28, 1952, Ser. No. 306,824

Int. Cl.[2] G21C *5/00*

U.S. Cl. 176—84 **3 Claims**



1. A neutronic reactor comprising, in combination, a solid moderator constructed of longitudinally extruded rectangular blocks of graphite stacked in abutting relationship in layers, the axes of extrusion of the blocks in successive layers being normal to each other, alternate layers having rows of blocks provided with longitudinal channels therein disposed in end to end relationship forming ducts through the moderator, said rows of channeled blocks being separated by rows of solid blocks, said channeled blocks having smaller dimensional cross sections and shorter lengths than the adjacent solid blocks in the same layer and concave ends, and spacer blocks of graphite disposed in abutting relationship between successive channeled blocks in each row of channeled blocks, said spacer blocks having channels therein tapering in from each side forming an annulus, said channels in the spacer blocks being aligned with the channels in the channeled blocks in each row to form a continuous duct through the moderator, the axes of extrusion of said spacer blocks being normal to that of the channeled blocks in said row, said spacer blocks being the same width as the solid blocks and the same height as the channeled blocks, and the combined length of one channeled block and one spacer block equaling the length of a solid block, the ends of said solid blocks in rows adjacent to channeled blocks terminating adjacent to spacer blocks, tubes disposed within the ducts, and material fissionable by neutrons of thermal energy disposed within the tubes.

4,004,974

LIVE VIRUS CULTURE VACCINE AGAINST CARNIVORE DISTEMPER AND METHOD OF PRODUCING SAME

Mikhail Petrovich Chumakov, Leninsky prospekt 68/10, kv. 354; Inna Alexandrovna Prokhorova, Balaklavsky prospekt, 40, kv. 59, both of Moscow; Viktor Pavlovich Grachev, poselok Instituta poliomielita, 3, kv. 36, Moskovskaya oblast; Valentina Vasilievna Petukhova, proezd Dezhneva, 30, korpus 2, kv. 131, Moscow; Julia Anatolievna Svezhinina, poselok Instituta poliomielita, 2, kv. 34, Moskovskaya oblast; Ljubov Leonidovna Mironova, poselok Instituta poliomielita, 1, kv. 7, Moskovskaya oblast; Ninel Mikhailovna Ralf, poselok Instituta poliomielita, 3, kv. 33, Moskovskaya oblast; Valentina Dmitrievna Popova, bulvar Generala Karbysheva, 9, korpus 1, kv. 45, Moscow; Aida Nurislamovna Mustafina, poselok Instituta poliomielita, 4, kv. 127, and Vladimir Ivanovich Chernyshev, poselok Instituta poliomielita, 3, kv. 4, both of Moskovskaya oblast, all of U.S.S.R.

Filed May 7, 1975, Ser. No. 575,220

Int. Cl.[2] C12K *7/00;* **A61K** *39/24*

U.S. Cl. 195—1.3 **6 Claims**

1. A live virus culture vaccine useful against carnivore distemper and which is safe for animals, prepared by the sequential steps of (1) pre-adapting an attenuated strain of carnivore distemper virus to a cell culture of monkey (green monkey) kidney tissue by 8 to 10 passages at a temperature of 34(±0.2)C°, the incubation period for viral growth ranging from 4 to 5 days; (2) cultivating the adapted strain in the cell culture of monkey (green monkey) kidney tissue, which cell culture is selected from among a primary cell culture or a subculture, in the presence of a nutrient medium at a temperature of 34(±0.2)C°; (3) removing the resultant virus-containing fluid of the degenerated cell detritus of said culture; and (4) lyophilizing the liquid vaccine thus formed in the presence of a suitable virus thermostabilizer.

4,004,975

METHOD OF ISOLATING AND CRYOPRESERVING HUMAN WHITE CELLS FROM WHOLE BLOOD

Fabian J. Lionetti, Milton, and Stephen M. Hunt, Allston, both of Mass., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 30, 1975, Ser. No. 645,161

Int. Cl.[2] C12K *9/00;* **F25D** *25/00;* **A61K** *35/14*

U.S. Cl. 195—1.8 **10 Claims**

1. A method of salvaging human white blood cells from the buffy coat of centrifuged human whole blood comprising:

isolating and removing by centrifuging the platelet rich plasma and a selected volume of the buffy coat of the topmost red cells from a blood collection bag containing a unit of whole blood;

preparing a 40% weight/volume solution of hydroxyethyl starch in water and further diluting this solution in an isotonic solution of salts containing 148 mequiv per liter each of cations Na^+ 140, K^+ 5 and Mg^{2+} 3, and anions including chloride 98, acetate 27 and gluconate 23 to dilutions on the order of from 10 to 16% of the 40% weight/volume solution;

obtaining a concentration of 4% hydroxyethyl starch at a hematocrit of 0.30 from said diluted solution by admixing selected volumes of concentrated hydroxyethyl starch and sedimenting out the red cells in the cell mixture;

siphoning off the red cells from said mixture of separated and concentrated cells into a sterile bag for storage;

admixing with the remaining white cells a sterile solution of 10% dimethylsulfoxide in said isotonic solution with said sedimented white cells;

freezing said white cells and storing the frozen white cells in an environment maintained at substantially −80° C;

thawing said concentration of white cells,

admixing with said thawed cells a sterile wash solution containing an isotonic solution as defined above but adjusted to a pH of 7.4 containing citrate-phosphate-dextrose in a 10 ml volume;

removing the supernatant layer of substantially 8.0 ml; and resuspending the residue of white cells in said adjusted isotonic solution by gentle agitation.

4,004,976

PROCESS FOR RECOVERING THE MAIN SAPOGENINS FROM THE ROOTS OF RHIZOMES OF HELLEBORUS

Otto Isaac, Bruchkobel, Germany, assignor to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

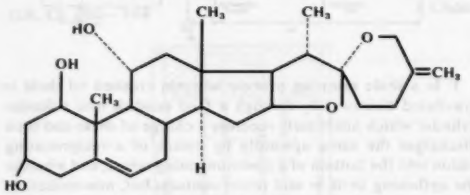
Filed Apr. 7, 1975, Ser. No. 565,698

Claims priority, application Germany, Apr. 8, 1974, 2416979

Int. Cl.² C12D *13/08*

U.S. Cl. 195—2 8 Claims

1. A process for the recovery of the main genin in the roots and rhizomes of a Helleborus species, said main genin having the formula



comprising treating the roots, rhizomes or an extract containing said main genin with an enzyme which is cellulase, hemicellulase or β-glucosidase and recovering said main genin after the enzyme treatment.

4,004,977

METHOD FOR PURIFYING *PULLULAN*

Koso Kato, and Tatsuo Nomura, both of Okayama, Japan, assignors to Kabushiki Kaisha Hayashibara Seibutsukagaku Kenkyujo, Okayama, Japan

Filed Jan. 22, 1975, Ser. No. 543,071

Claims priority, application Japan, Jan. 31, 1974, 49-12263

Int. Cl.² C12D *13/04*

U.S. Cl. 195—31 P 3 Claims

1. In a method for purifying pullulan which comprises cultivating a pullulan producing microorganism in a liquid medium, removing the cells from the culture broth, precipitating pullulan present in said broth with a solvent to recover the pullulan, and then dehydrating and/or drying the recovered pullulan, the improvement wherein said solvent is selected from the group consisting of esters, and ketones which have about 20 to 25% solubility in water.

4,004,978

MICROBIOLOGICAL REDUCTION OF ZEARALENONE AND RELATED COMPOUNDS

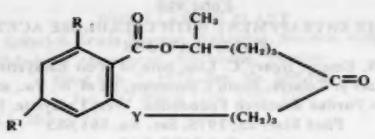
James Robert McMullen, Terre Haute, Ind., assignor to IMC Chemical Group, Inc., Terre Haute, Ind.

Filed Sept. 19, 1975, Ser. No. 615,044

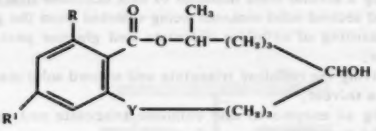
Int. Cl.² C12D *13/00*

U.S. Cl. 195—51 R 17 Claims

1. A method for reducing a keto-compound of the formula



to a hydroxy-compound of the formula



wherein R and R¹ may be the same or different and each is selected from the group consisting of hydrogen, hydroxy, and —OR², wherein R² is selected from the group consisting of lower alkyl of from 1 to about 6 carbon atoms, monocyclic aryl of about 6 to 8 carbon atoms, and monocyclic aralkyl, in which the alkyl portion has 1 to about 5 carbon atoms and the aryl portion has about 6 to 8 carbon atoms; and Y is selected from the group consisting of —CH_2—CH_2— and —CH=CH—, which comprises cultivating a ketone-reducing, enzyme-producing microorganism in a nutrient fermentation medium, said enzyme being capable of reducing the keto-group of said keto-compound, and contacting the keto-compound with the ketone-reducing enzyme produced by the microorganism to reduce the keto-compound to produce the hydroxy-compound.

4,004,979

PREPARATION OF ACTIVE PROTEINS CROSS-LINKED TO INACTIVE PROTEINS

Stratis Avrameas, La Celle Saint Cloud; Georges Broun, Rouen; Eric Sélégny, Rouen, and Daniel Thomas, Rouen, all of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly-sur-Seine, France

Continuation of Ser. No. 286,233, Sept. 5, 1972, abandoned, which is a continuation-in-part of Ser. No. 810,835, March 26, 1969, abandoned. This application Jan. 15, 1975, Ser. No. 541,257

Claims priority, application France, Mar. 29, 1968, 68.146205; Jan. 29, 1969, 69.01451; Mar. 19, 1969, 69.07897

Int. Cl.² C07G *7/02*, *7/00*

U.S. Cl. 195—68 3 Claims

1. A process for producing an article containing a cross-linked active protein substance which comprises dispersing, mixing and reacting in a solvent medium 1. an active protein and 2. an inactive protein simultaneously with 3. a cross-linking agent for said proteins under cross-linking conditions for said cross-linking agent until an active protein substance is formed containing said active protein cross-linked with said inactive protein substance, controlling the degree of cross-linking by introducing tris (hydroxymethyl) aminomethane in an amount sufficient to stop chain growth, said formed active protein substance amounting to about 1 to 20% by weight of the total proteinic substances and said cross-linking agent amounting to about 0.5 to 8% weight based on the weight of the whole mixture being reacted and separating the solvent from said formed active protein substance.

4,004,980

ENZYME ENTRAPPMENT WITH CELLULOSE ACETATE FORMULATIONS

Alden H. Emery; Henry C. Lim, both of West Lafayette, and Michael J. Kolarik, South Charleston, all of W. Va., assignors to Purdue Research Foundation, West Lafayette, Ind.

Filed Mar. 25, 1975, Ser. No. 561,685
Int. Cl.² C07G 7/02
U.S. Cl. 195—68 8 Claims

1. A method of forming an entrapped enzyme, said method comprising:

providing cellulose triacetate in solid form;

adding a second solid material to said cellulose triacetate, said second solid material being selected from the group consisting of cellulose diacetate and glucose pentaacetate;

dissolving the cellulose triacetate and second solid material in a solvent;

adding an enzyme to said cellulose triacetate and second solid material;

extruding said dissolved cellulose triacetate and said second solid material through an orifice to form a solid matrix soluble in a swelling liquid and

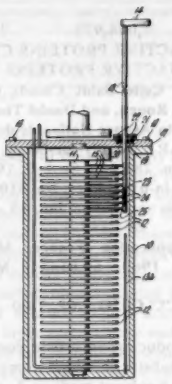
soaking said solid matrix in an aqueous solution of acetone and water containing between about 50 to 98% acetone for swelling said matrix to increase the permeability of the solid matrix.

4,004,981

CELL REMOVING DEVICE

William M. Hurni, North Wales; William J. McAleer, Ambler, and Maurice R. Hilleman, Lafayette Hill, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed May 1, 1975, Ser. No. 573,655
Int. Cl.² C12K 9/00, 1/10
U.S. Cl. 195—127 9 Claims



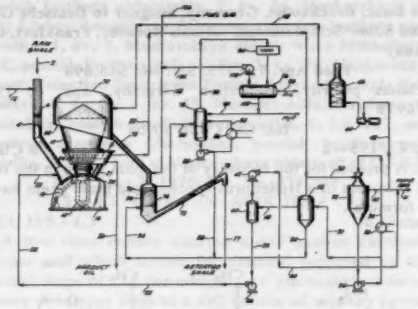
1. In a multiplate cell propagator comprising a substantially cylindrical vessel having a plurality of spaced apart parallel discs on which cells are grown, the discs mounted on a rotatable shaft within the vessel, the improvement comprising a second shaft pivotably mounted within the vessel, the second shaft having mounted thereon parallel to the plane of the discs a contacting means adapted to contact at least part of the surface of a disc upon pivotal movement of the second shaft whereby cells are removed from the surface of the disc, the contacting means comprising a substantially rod-like member.

4,004,982

SUPERATMOSPHERIC PRESSURE SHALE RETORTING PROCESS

Don C. Jennings, and Roland O. Dhondt, both of Long Beach, Calif., assignors to Union Oil Company of California, Los Angeles, Calif.

Filed May 5, 1976, Ser. No. 683,287
Int. Cl.² C10B 53/06
U.S. Cl. 201—29 9 Claims



1. In a shale retorting process wherein crushed oil shale is gravitated downwardly through a feed conduit into a feeder cylinder which alternately receives a charge of shale and then discharges the same upwardly by means of a reciprocating piston into the bottom of a communicating retort, and wherein the upflowing shale in said retort contacts hot, non-oxidative, downflowing education gases to educe product oil and gas from said upflowing oil shale, said oil and gas being discharged from the bottom portion of said retort into an isobaric product collection vessel in which a first liquid level of oil is maintained, and wherein hot, retorted shale overflowing the top of said retort is transferred through a gas-tight transfer conduit to a water quenching zone, the improvements which comprise:

1. maintaining substantially continuous hydraulic communication between the product oil in said collection vessel and the bottom of said feed conduit, whereby a second liquid oil level is maintained in said feed conduit;
2. maintaining a first liquid water level in said quenching zone, substantially below the top of the retorted shale bed maintained therein, whereby a quench gas mixture comprising superheated steam and combustable water gas is generated in said quenching zone;
3. removing shale from the bottom of said quenching zone through an upwardly extending outlet conduit communicating therewith below said first liquid water level, whereby a second liquid water level is maintained in said outlet conduit, the rate of removal of said retorted shale being controlled so as to maintain the top of said retorted shale bed substantially above said first liquid water level; and
4. maintaining superatmospheric pressures throughout said retort while preventing the discharge of retort gases through said feed conduit and said outlet conduit solely by means of the hydrostatic seals established by the oil in said feed conduit and by the water in said outlet conduit.

7. In a shale retorting process wherein crushed oil shale is fed upwardly through a vertical retort in countercurrent contact with hot, non-oxidative, downflowing eduction gases to educe product oil and gas from said upflowing oil shale, said oil and gas being discharged from the bottom portion of said retort, and wherein retorted shale at a temperature of about 900° – 1100° F overflows the top of said retort and is transferred through a gas-tight transfer conduit to a water quenching zone, the improvements which comprise:

1. maintaining a first liquid water level in said quenching zone substantially below the top of the retorted shale bed maintained therein, whereby a quench gas mixture com-

prising superheated steam and combustible water gas is generated in said quenching zone solely by means of heat derived from said retorted shale;

2. removing shale from the bottom of said quenching zone through an upwardly extending outlet conduit communicating therewith below said first water level, whereby a second liquid water level is maintained in said outlet conduit, the rate of removal of said retorted shale being controlled so as to maintain the top of said retorted shale bed substantially above said first liquid water level; and

3. preventing the discharge of retort gases and quench gases through said outlet conduit solely by means of the hydrostatic seal established by the water in said outlet conduit.

4,004,983

COKE OVEN BATTERY

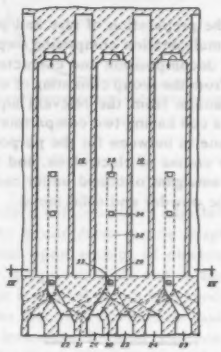
Erich Pries, Bochum, Germany, assignor to Dr. C. Otto & Comp. G.m.b.H., Bochum, Germany

Filed Mar. 28, 1975, Ser. No. 562,814

Claims priority, application Germany, Apr. 4, 1974, 2416434

Int. Cl.² C10B *5/12, 5/14, 5/16*

U.S. Cl. 202—142 **3 Claims**



1. In a coke oven battery of the type heated optionally by lean gas or rich gas and which includes a twin heating flues disposed in a row between the coke oven chambers, the twin heating flues being defined by continuous and discontinuous crosswalls in an alternating arrangement, each heating flue having inlets at its base for rich and lean gas, and cross-regenerators below the coke oven chambers, each of said cross-regenerators being operated over its entire length in the same flow line during a single heating half-cycle and in reverse during the other half-cycle, said twin heating flues being defined by crosswalls incorporating passageways therein that define header flues in each of the crosswalls for preheated air and alternatively as exit ports at intervals of graduated elevations, the improvement comprising:

means defining a first series of ducts extending in a gaseous conducting manner between a first one of said regenerators and every other header flue in each of two adjacent rows of said twin heating flues for conducting preheated air during a heating half-cycle, said means further defining a second series of ducts extending in a gaseous conducting manner between of second of said regenerators and exit ports in the bottom of the heating flues forming said two adjacent rows thereof for conducting preheated lean gas when heating a coke oven chamber thereby and for conducting preheated air when heating a coke oven chamber with rich gas, said first and second series of ducts being arranged alternatively from row-to-row of heating flues in a manner to alternate the sequence of upgoing and downgoing sections of twin flues between rows thereof.

4,004,984

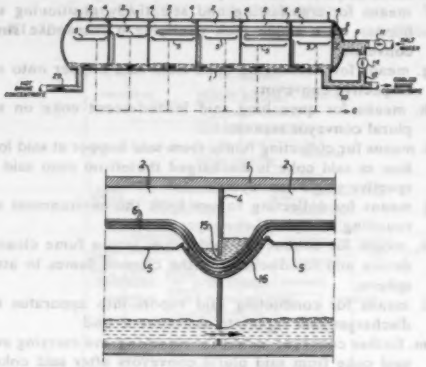
DISTILLATION PLANT

Peter Heinrich Erwin Margen, Nykoping, Sweden, assignor to Aktiebolaget Atomenergi, Stockholm, Sweden

Filed Feb. 7, 1975, Ser. No. 548,098

Int. Cl.² B01D *1/28, 3/02, 1/26*

U.S. Cl. 202—173 **6 Claims**



1. Distillation plant comprising an axially elongated tubular shaped shell, a plurality of generally vertically positioned horizontally spaced partitions extending transversely of the axis of said shell and dividing the interior of said shell into a plurality of serially arranged vaporizing chambers, a bundle of condenstion tubes extending through said vaporizing chambers and passing through said partitions between adjacent said vaporizing chambers, at least one of said partitions having an opening therethrough with said tube bundle passing through said opening, a bowl positioned in the opening in said partition and extending outwardly therefrom into each of the adjacent said chambers with the upper edge of said bowl located at least above the uppermost point of the opening through said partition, said tube bundle extending through and dipping into said bowl on both sides of said partition, and said bowl arranged to receive distillate to a level above the uppermost point of the opening in said partition so that a water lock is formed within said bowl for sealing the adjacent said chambers from one another.

4,004,985

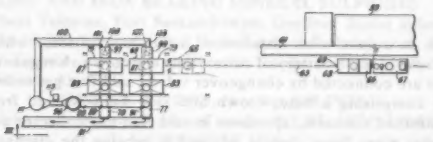
SYSTEM FOR QUENCHING HOT COKE

William D. Edgar, Allison Park; John D. Sustarsic, McKees Rocks, and Allan F. Adamsky, Washington, all of Pa., assignors to Koppers Company, Inc., Pittsburgh, Pa.

Division of Ser. No. 286,752, Sept. 5, 1972, abandoned. This application Sept. 13, 1974, Ser. No. 505,855

Int. Cl.² C10B *39/12*

U.S. Cl. 202—230 **4 Claims**



1. In a coke oven battery, the improved coke quenching system comprising:

a. a quenching car track disposed alongside said battery and extending therefrom to a remote location relative to said battery;

b. a hopper removably mounted to a frame that is movable

on said track, said hopper being adapted for receiving incandescent pushed coke from said battery;

c. means for moving said frame and hopper along said track to said remote location;

d. plural racks disposed at said remote location for supporting said hopper;

e. plural conveyor means disposed relative to said plural racks respectively;

f. means for transferring and selectively positioning said hopper on a single rack overlying a respective single conveyor;

g. means for discharging coke from said hopper onto said respective conveyor;

h. means for quenching said incandescent coke on said plural conveyor means;

i. means for collecting fumes from said hopper at said location as said coke is discharged therefrom onto said respective single conveyor;

j. means for collecting vapors from the environment surrounding said plural conveyor means;

k. means for conducting said fumes into a fume cleaning device and for discharging the cleaned fumes to atmosphere;

l. means for conducting said vapors into apparatus that discharges said vapors to atmosphere; and

m. further conveyor means for removing and carrying away said coke from said plural conveyors after said coke is quenched.

4,004,986

FLUE GAS COLLECTOR FOR REGENERATIVELY-HEATED COKE OVENS

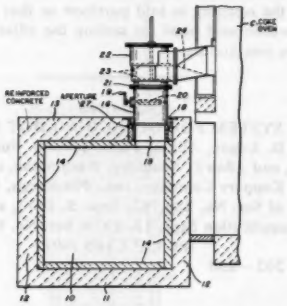
Wolfgang Franzer, Varenholzstrasse 17, 464 Wattenscheid, and Hans Adamus, Kriemhildenstrasse 5, 43 Essen, both of Germany

Filed Jan. 30, 1975, Ser. No. 545,123

Claims priority, application Germany, Mar. 16, 1974, 2412749

Int. Cl.² C10B *27/00*; C10J *3/82*

U.S. Cl. 202—254 **8 Claims**



1. In a coke oven installation, a flue gas collector which extends along a battery of coke ovens and to which regenerators are connected by changeover valves, said flue gas collector comprising a base, crown and side walls formed from reinforced concrete, apertures in said flue gas collector and socket pipes fitted therein adapted to receive the discharge ends of outlet pipes leading from said changeover valves, and insulating material lining the interior wall surfaces of said base, crown and side walls and between the inlet ends of said socket pipes and said discharge ends of the outlet pipes, the nature and thickness of said insulating material being such that said reinforced concrete at no time during oven operation exceeds a temperature of 100° C.

4,004,987

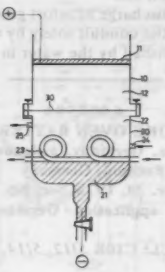
METHOD FOR THE PREPARATION OF RARE AND PRECIOUS METALS BY ELECTROLYTICAL AMALGAMATION USING ION EXCHANGE MEMBRANE

Chau-Ting Chang, Taiwan, China /Taiwan, assignor to Institute of Nuclear Energy Research, Taiwan, China /Taiwan

Filed Oct. 15, 1974, Ser. No. 514,479

Int. Cl.² C25C *5/02*

U.S. Cl. 204—1.5 **3 Claims**



1. Method for the preparation of rare and precious metals by electrolytical amalgamation comprising steps of amalgamation and thermal decomposition and characterized by amalgamating a metal from the group consisting of uranium, neptunium and transuranium from the relevant aqueous solution electrolytically in a cell having two compartments with an ion exchange membrane in between for the purpose of adjusting the pH during the course of electrolysis, and then thermally decomposing the amalgam obtained under reduced pressure to produce metallic powder and solid metal.

4,004,988

METHOD OF PREPARING SODIUM CHLORATE BY ELECTROLYSIS

Paul Mollard, Sainte Foy les Lyon, and Pierre Lakodey, Saint Priest, both of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

Filed Sept. 25, 1974, Ser. No. 509,057

Claims priority, application France, Sept. 25, 1973, 73.34248

Int. Cl.² C25B *1/26*

U.S. Cl. 204—95 **1 Claim**

1. A method for preparing sodium chlorate which comprises electrolyzing an aqueous solution of sodium chloride in the presence of at least one phosphorus-containing complexing agent which is a phosphoric, polyphosphoric or metaphosphoric acid or an alkali-metal salt thereof in an amount of from about 0.5 to 10 times the concentration stoichiometrically equivalent to the alkaline earth concentration in said aqueous solution, wherein said presence of complexing agent is effected by adding to said aqueous sodium chloride solution a phosphorus substance capable of generating phosphates, polyphosphates or metaphosphates under the conditions of the electrolysis, said substance being phosphine, elemental phosphorus, hypophosphites, hypophosphates, phosphorus halides or phosphorus oxyhalides.

4,004,989

METHOD FOR AUTOMATIC ADJUSTMENT OF ANODES BASED UPON CURRENT DENSITY AND CURRENT

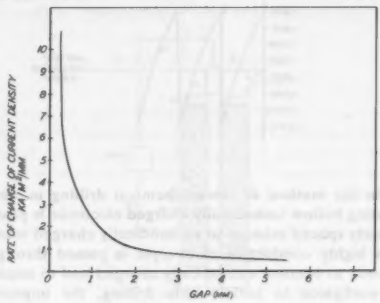
Richard W. Ralston, Jr., Cleveland, Tenn., assignor to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 461,822, April 18, 1974, Pat. No. 3,873,430, which is a continuation-in-part of Ser. No. 272,240, July 17, 1972, abandoned. This application Mar. 21, 1975, Ser. No. 561,014

The portion of the term of this patent subsequent to Mar. 25, 1992, has been disclaimed.

Int. Cl.² C25B *1/36, 15/04, 15/06*

U.S. Cl. 204—99 21 Claims



1. In an electrolytic cell containing adjustable anodes operably connected to motor drive means adapted to raise and lower said anodes upon receipt of electric signals from a digital computer, a liquid cathode and an aqueous electrolyte wherein a voltage is applied across said anodes and said cathode to develop an electric current from said anodes through said aqueous electrolyte to said cathode, the improved method for positioning a minor fraction of said anodes at an optimum distance from said cathode which comprises

a. positioning a minor fraction of said anodes above said cathode at a distance apart so that when said minor fraction of anodes is moved in either direction an incremental distance, there is a relatively small change in current passing through said minor fraction of anodes,

b. moving said minor fraction of anodes in the direction of said cathode at a substantially constant rate, and conveying electric signals to said computer to indicate the distance travelled by said minor fraction,

c. measuring said current through said minor fraction of anodes, conveying electric signals to said computer to indicate said current and calculating in said computer the change in the current density per unit of distance as said minor fraction of anodes moves toward said cathode, comparing the resulting calculated change in current density with distance with a predetermined limit,

d. conveying signals to said motor drive means to discontinue movement of said minor fraction of anodes towards said cathode when the change in said current density per unit of distance reaches a predetermined limit, and

e. after said discontinued movement, measuring the current to said minor fraction of anodes for a predetermined period, conveying electric signals to said computer to indicate said current for said predetermined period, comparing said signals with a predetermined limit, and sending signals to said motor drive means to raise said minor fraction of anodes when the current during the predetermined period increases beyond a predetermined limit.

4,004,990

PROCESS FOR SEPARATING AND RECOVERING NICKEL AND COBALT

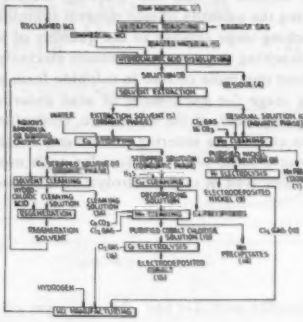
Airi Suetsuna, and Toshimasa Iio, both of Niihama, Japan, assignors to Sumitomo Metal Mining Co., Limited, Tokyo, Japan

Filed Aug. 6, 1974, Ser. No. 495,288

Claims priority, application Japan, Sept. 21, 1973, 48-105987

Int. Cl.² C25C *1/08*; C22B *3/00*

U.S. Cl. 204—113 8 Claims



1. A process for separating and recovering nickel and cobalt from a mixed aqueous chloride solution containing nickel and cobalt, as well as iron, copper, zinc and manganese as impurities, comprising:

contacting the chloride solution, in extracting relationship, with a triamine organic solvent selected from the group consisting of trinormaloctylamine and triisooctylamine to produce (1) an organic extract phase containing the amines and said cobalt, together with the iron, copper and zinc impurities, and at least a portion of the manganese impurities, and (2) a first aqueous phase containing said nickel together with the remainder of the manganese impurities;

treating said nickel-containing first aqueous phase to cause the manganese therein to precipitate and thereby provide a purified solution of nickelous chloride;

contacting said organic extract phase, in extracting relationship, with water to produce (1) a second aqueous phase containing said cobalt together with the manganese impurities and a portion of the copper impurities, and (2) an organic solvent phase containing said amines and the iron and zinc impurities, together with the remainder of the copper impurities; and

treating the cobalt-containing second aqueous phase to remove the copper and manganese impurities therefrom and thereby provide a purified solution of cobaltous chloride.

4,004,991

TWO-STAGE PRESSURE LEACHING PROCESS FOR ZINC AND IRON BEARING MINERAL SULPHIDES

Herbert Veltman, Fort Saskatchewan; Geoffrey James Julien Mould, Flin Flon, and Paul Kawulka, Fort Saskatchewan, all of Canada, assignors to Sherritt Gordon Mines Limited, Toronto, Canada

Filed Dec. 12, 1975, Ser. No. 640,292

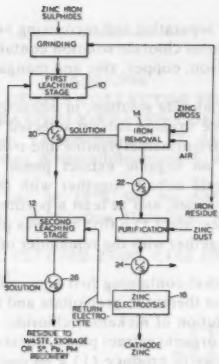
Claims priority, application Canada, Oct. 22, 1975, 238439

Int. Cl.² C25C *1/16*

U.S. Cl. 204—119 6 Claims

1. In a process for recovering zinc from zinc and iron-containing mineral sulphides in which the sulphides, in finely divided form, are pressure leached with aqueous sulphuric acid solution under oxidizing conditions to convert sulphide sulphur to elemental form and produce a zinc sulphate bearing leach-end solution which, after purification, is subjected to

electrolysis to recover cathode zinc and produce a return electrolyte containing residual zinc values and sulphuric acid, the improved procedure for obtaining rapid and substantially complete extraction of zinc from said sulphides and for producing a leach-end solution low in dissolved iron and free acid which comprises conducting said pressure leaching under a positive partial pressure of oxygen and at a temperature above about 135° C. but below about 175° C. in two countercurrent stages with said mineral sulphides being fed into the first of said two leaching stages and said return electrolyte being fed into the second of said two leaching stages; adjusting and co-relating the quantity of said mineral sulphides fed into said first leaching stage relative to the quantity of acid fed to said second leaching stage with said return electrolyte such that at least about one mole of zinc in sulphide form enters said first leaching stage for each mole of acid entering said second leaching stage and, at the same time, controlling the quantity of return electrolyte entering said second leaching stage such that about 1 mole of acid enters for each mole of zinc that must be dissolved in said electrolyte to increase the zinc concentration thereof to a predetermined level suitable for treatment of said solution in said electrolysis operation; continuing said first leaching stage to extract zinc values from said mineral sulphides with concurrent conversion of sulphide sulphur to elemental sulphur and to produce a first stage leach residue containing unreacted sulphides, elemental sulphur and precipitated iron and a first stage leach solution having a pH above 1 and containing dissolved zinc, less than about 3 g.p.l. free sulphuric acid and less than 2 g.p.l. of dissolved iron; passing said first stage leach solution to said purification and then to said electrolysis steps and passing said first stage leach residue to said second leaching stage; continuing said second leaching stage to extract substantially all zinc from said first stage leach residue and to produce a second stage leach residue containing any unreacted sulphides, elemental sulphur and precipitated iron and a second stage leach solution containing said extracted zinc, unreacted sulphuric acid and dissolved iron; and separating said second stage leach solution from said second stage leach residue and passing said second stage leach solution to said first leaching stage.



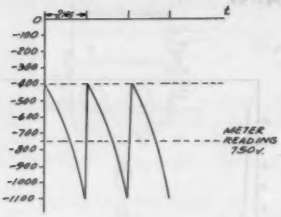
4,004,992
POWER SUPPLY FOR ELECTROCHEMICAL MACHINING

Roger K. Tyler, Detroit, and James D. Andrews, Birmingham, both of Mich., assignors to TRW Inc., Cleveland, Ohio

Continuation-in-part of Ser. No. 539,318, Jan. 8, 1975, abandoned, which is a continuation of Ser. No. 347,779, April 4, 1973, abandoned. This application Mar. 15, 1976, Ser. No. 666,767

Int. Cl.² C25F 3/00

U.S. Cl. 204—129.55 10 Claims



1. In the method of electrochemical drilling in which an insulating hollow cathodically charged electrode is positioned in closely spaced relation to an anodically charged workpiece and a highly conductive electrolyte is passed through said electrode to become cathodically charged and to impinge on said workpiece to initiate hole drilling, the improvement which comprises applying to said electrolyte a negative voltage having a substantial negative DC component and negative pulses superimposed thereon, said pulses providing a ripple which is from 75 to 600% of said negative DC component, the pulses being the sole source of the electrochemical drilling current, and the amplitude of the pulses being insufficient to cause a spark discharge to occur between the electrode and the workpiece.

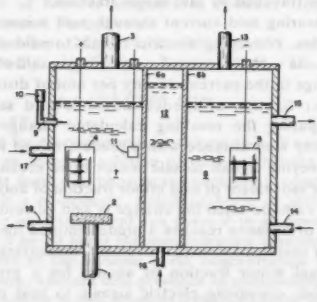
4,004,993
ELECTROLYTIC TRAPPING OF IODINE FROM PROCESS GAS STREAMS

Donald E. Horner; James C. Mailen, both of Oak Ridge, and Franz A. Posey, Concord, all of Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Feb. 26, 1976, Ser. No. 661,571

Int. Cl.² C25B 1/24

U.S. Cl. 204—131 6 Claims



1. A method of removing molecular, inorganic, and organic forms of iodine from a gaseous atmosphere, said method comprising contacting said gaseous atmosphere with anolyte

of an operating partitioned electrolytic cell, said electrolytic cell comprising an anode compartment containing anolyte and a cathode compartment containing catholyte, said anolyte comprising an aqueous nitric acid solution containing a catalytic amount of cobalt ions to effect the electrolytic oxidation of iodine in said atmosphere to iodine species soluble in said anolyte.

4,004,994

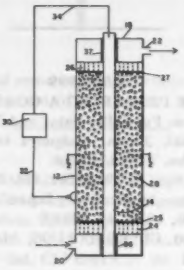
ELECTROCHEMICAL REMOVAL OF CONTAMINANTS

Joseph M. Andrus, Park Ridge, Ill., assignor to Stauffer Chemical Company, Westport, Conn.

Continuation of Ser. No. 271,082, July 12, 1972, abandoned. This application May 16, 1974, Ser. No. 470,421

Int. Cl.² C02B 1/82

U.S. Cl. 204—149 **13 Claims**



1. An apparatus for the removal of ionic contaminants for aqueous solutions which comprises:

a. a vertically disposed cylindrical electrode;

b. an internal electrode, axially disposed within said cylindrical electrode;

c. a particulate bed comprising carbonaceous particles disposed between and in contact with said cylindrical electrode and said internal electrode, said particulate bed retained in disposition between said electrodes by retaining means thereby forming a medium of lower electrical conductivity between said electrodes;

d. a source of direct current which is in electrical communication with said cylindrical electrode and said internal electrode in such manner as to induce a potential difference between said electrodes across said bed;

e. a base header and a top header fitted over the ends of said cylindrical electrode thereby forming a closed system;

f. input means in open communication with the base of said cylindrical electrode such that the solution to be treated can be continuously introduced into said cylindrical electrode; and

g. output means in open communication with the top of said cylindrical electrode such that the treated solution can be continuously removed from said cylindrical electrode.

7. A method of removing ionic contaminants from aqueous solution comprising:

a. continuously feeding said solution into the base of a vertical treatment zone formed by a vertically disposed cylindrical electrode and an internal electrode axially disposed within said cylindrical electrode, said treatment zone additionally containing a particulate bed comprising carbonaceous particles disposed between and in contact with said cylindrical electrode and said internal electrode, said particulate bed retained in disposition between said electrodes by retaining means thereby forming a medium of lower electrical conductivity between said electrodes, in such a manner that the solution rises vertically through said bed while applying an electrical potential across said bed sufficient to maintain a current density of at least 10 amps/cu. ft. of bed, and

b. continuously removing said solution from the top of said treatment zone.

4,004,995

PROCESS FOR REMOVING NITROGEN OXIDES AND SULFUR DIOXIDE FROM EFFLUENT GASES

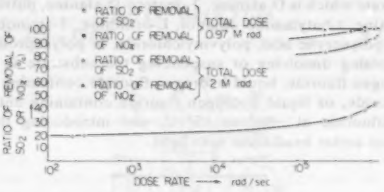
Sueo Machi, Takasaki; Keita Kawamura, Yokohama; Shingi Aoki, Fujisawa; Waichiro Kawakami, and Shoji Hashimoto, both of Takasaki, all of Japan, assignors to Ebara Manufacturing Co., Ltd. and Japan Atomic Energy Research Institute, both of Tokyo, Japan

Filed Feb. 28, 1974, Ser. No. 446,788

Claims priority, application Japan, Mar. 3, 1973, 48-25290; Mar. 3, 1973, 48-25292; Aug. 15, 1973, 48-91549; Aug. 15, 1973, 48-91550; Sept. 22, 1973, 48-107123

Int. Cl.² B01J 1/00

U.S. Cl. 204—157.1 H **12 Claims**



1. A process for removing NO_x and SO_2 from effluent gases, comprising

increasing the pressure of the effluent gases containing NO_x and SO_2 in a reaction chamber to a pressure in the range of from more than atmospheric pressure to about 2 atmospheres and at the same time irradiating the pressurized gases with an ionizing radiation from a radiation source which is placed near or in said reaction chamber, thereby converting gaseous pollutants, NO_x and SO_2, to mist and solid particles, and then

collecting the particles thus produced by a mist and dust collector.

4. A process for removing NO_x from effluent gases, comprising

delivering the effluent gases containing NO_x to a reaction chamber inlet,

moving said gases through the reaction chamber and at the same time irradiating the gases, including at least 1% by volume of oxygen, with an ionizing radiation from a radiation source placed near said reaction chamber, thereby converting gaseous NO_x to mist and/or solid particles,

delivering the irradiated gases with the particles thus produced to a washing tower, and there washing the gases with water and/or alkaline solution, and then

releasing the washed gases into the atmosphere.

7. A process for removing NO_x from effluent gases, comprising delivering the effluent gases containing NO_x and at least an equivalent amount of moisture to a reaction chamber inlet, moving said gases through the reaction chamber and at the same time irradiating the gases with an ionizing radiation thereby converting gaseous pollutant, NO_x, to mist and/or solid particles, and then

collecting the particles thus produced by a mist and dust collector.

10. A two-step process for removing NO_x and SO_2 from effluent gases, comprising

delivering said effluent gases containing NO_x and SO_2 to a reaction chamber inlet,

moving said effluent gases through said reaction chamber and irradiating them with an ionizing radiation from a radiation source which is placed near or in said reaction chamber thereby converting substantially all of the gaseous NO_x to mist and/or fine solid particles.

delivering the thus irradiated gases containing mist and/or fine solid particles as well as the remaining gaseous SO_2 to a collecting apparatus and there separating said mist and/or fine solid particles from the gases,

delivering the thus-treated gases containing substantial

amounts of gaseous SO_2 to a means for desulfurization which does not depend on irradiation, and there removing the remaining SO_2, and

releasing the thus purified gases into the atmosphere.

4,004,996

FLUORINATION OF ORGANIC COMPOUNDS

Janos Kollonitsch, Westfield, N.J., assignor to Merck & Co., Inc., Rahway, N.J.

Filed Dec. 23, 1974, Ser. No. 535,878

Int. Cl.² C07C *87/22, 91/06, 101/10;* **B01J** *1/10*

U.S. Cl. 204—158 HA **6 Claims**

1. A process for substitutive C-fluorination of an organic substrate which is D-alanine, 2-deutero-D-alanine, putrescine, spermine, t-butylamino ethanol, L-ornithine, 2-aminobutyric acid, polyacrylic acid, polyvinylchloride, or polycaprolactone comprising dissolving or suspending the substrate in liquid hydrogen fluoride, liquid hydrogen fluoride containing boron trifluoride, or liquid hydrogen fluoride containing antimony pentafluoride at −80° to 15° C. and introducing fluorine thereto under irradiation with light.

4,004,997

PROCESS OF CURING A POLYMERIZABLE COMPOSITION CONTAINING A MAGNETIZED POWERED FERROMAGNETIC MATERIAL WITH RADIOACTIVE RAYS

Kenkichi Tsukamoto, Fujihara; Yusuke Matsumura, Chigasaki, and Ryuichi Sano, Kamakura, all of Japan, assignors to Seiko Shimada, Tokyo; Teizo Takahashi, Imaichi and Mitso Nishida, Chigasaki, all of, Japan

Continuation-in-part of Ser. No. 327,639, Jan. 29, 1973, abandoned. This application Jan. 23, 1975, Ser. No. 543,454

Claims priority, application Japan, Jan. 30, 1972, 47-10856

Int. Cl.² C08F *8/00, 2/46*

U.S. Cl. 204—159.14 **9 Claims**

1. A process of curing a composition comprising the step of mixing at least one polymerizable ethylenically unsaturated composition selected from the group consisting of polymerizable resins having ethylenically unsaturated groups therein and ethylenically compounds and a filler comprising a magnetized powdery ferromagnetic substance in an amount of 1.5 to 998 parts by weight based on 100 parts by weight of the at least one polymerizable composition and then curing the mixture with radioactive rays selected from the group consisting of α-rays, βrays, γrays, X rays and electron beams in an amount of from 2.5 to 10 Mrads.

4,004,998

PHOTOPOLYMERIZABLE COMPOUNDS AND COMPOSITIONS COMPRISING THE PRODUCT OF THE REACTION OF A HYDROXY-CONTAINING ESTER AND A MONOCARBOXY-SUBSTITUTED BENZOPHENONE

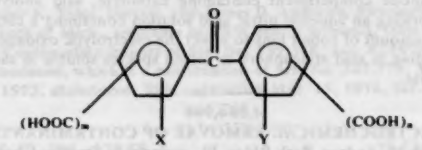
George Rosen, Wayne, N.J., assignor to Sun Chemical Corporation, New York, N.Y.

Division of Ser. No. 405,517, Oct. 11, 1973, Pat. No. 3,926,640, which is a continuation-in-part of Ser. No. 200,174, Nov. 18, 1971, abandoned. This application Apr. 25, 1975, Ser. No. 571,783

Int. Cl.² C08F *2/46, 4/00*

U.S. Cl. 204—159.22 **9 Claims**

1. A photopolymerizable compound comprising the product of the reaction of (1) a monomeric hydroxy-containing polyethylenically unsaturated ester or a monomeric isocyanatemodified hydroxy-containing polyethylenically unsaturated ester which is the product of the reaction of (a) an ethylenically unsaturated acid and (b) a polyhydric alcohol and (2) a monocarboxy-substituted benzophenone having the formula



wherein m and n is each 0 or 1 and the sum of m plus n is 1; and X and Y is each 1 to 4 halogen atoms or dialkylamino groups having 1 to 4 carbon atoms; X and Y may be the same or different and either or both may be omitted, the benzophenone moiety being about 5-50 weight percent of the product.

4,004,999

PROCESS FOR PREPARING A COATED PRODUCT

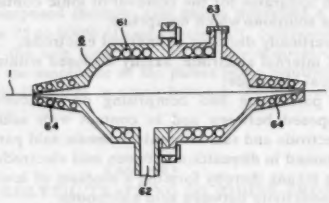
Kyoichi Shibayama; Fumihiko Sato, and Takashi Takahama, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 3, 1975, Ser. No. 564,908

Claims priority, application Japan, Apr. 30, 1974, 49-49012; Apr. 30, 1974, 49-49013

Int. Cl.² C25D *13/06, 13/16*

U.S. Cl. 204—181 **4 Claims**



1. A process for preparing a coated product which comprises electrodepositing a varnish from a water dispersion onto a conductive substrate; dipping said coated substrate into hot water so that the varnish is treated with said hot water; and thereafter treating said varnish coating with compressed steam.

4,005,000

ELECTROCOATING APPARATUS AND METHOD

John L. Kraska, Riverside, Ill., assignor to National Can Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 397,889, Sept. 17, 1973, abandoned. This application Sept. 18, 1975, Ser. No. 614,353

Int. Cl.² B65G *49/02;* **C25D** *13/06, 17/06*

U.S. Cl. 204—181 **25 Claims**

21. A method for electrocoating articles, such as can ends, in a basin containing an electrolytic solution and a fixed anode, comprising continuously moving a plurality of hangers along a predetermined path with a lower portion of said path being located directly above said basin, said hangers each having a body portion and an electrically conductive jaw pivoted on said body portion and normally biased to a closed position, pivoting said jaw to an open position at a location upstream of said basin, inserting a peripheral portion of said article between said moving body portion and said jaw and releasing said jaw to grip a peripheral edge of said article, engaging each moving hanger with a fixed cathode track along

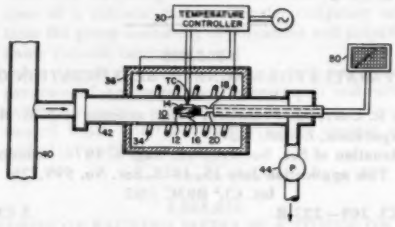
said lower portion of said path to produce a current flow through said jaw to said article while said article is immersed

in said solution, and removing each article from said hangers at a location downstream of said basin.

4,005,001
COMBUSTIBLES SENSOR

Alfred R. Pebler, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 27, 1973, Ser. No. 345,393
Int. Cl.² G01N 27/46
U.S. Cl. 204—195 S **3 Claims**



1. Apparatus for determining the presence of predetermined combustible constituents such as methane, hydrogen and carbon monoxide, in an excess oxygen gas mixture, comprising, an oxygen ion conductive solid electrolyte electrochemical cell including a first and second electrode means disposed on opposite surfaces thereof, means adapted for supplying an excess oxygen gas mixture containing one or more combustibleconstituents simultaneously to said first and second electrodes, said first electrode composed of a material for supporting a first rate of catalytic combustion reactivity between said oxygen and combustible constituents of said mixture and said second electrode composed of a material exhibiting a second rate of catalytic combustion reactivity between said oxygen and combustible constituents of said gas mixture, said first rate of catalytic combustion reactivitybeing different than said second rate of catalytic combustion reactivity so as to produce an oxygen potential difference between said first and second electrodes, said solid electrolyte electrochemical cell developing an output signal corresponding to said oxygen potential difference, said output signal being indicative of the cumbustible constituents present in said gas mixture,

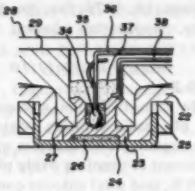
sadi oxygen potential difference produced by said combustible constituents being a function of the temperature of said solid electrolyte electrochemical cell and each particular combustible constituent producing a maximum oxygen potential difference at a predetermined temperature, and

means for maintaining said solid electrolyte electrochemical cell at the predetermined temperature at which maximum oxygen potential difference is produced by a combustible constituent of interest.

4,005,002
APPARATUS FOR MEASURING SUBSTRATE CONCENTRATIONS

Philippe Racine, Munchenstein, Switzerland; Jean-Claude Higelin, Hegenheim; Roland Engelhardt, Mulhouse, both of France, and Wolfgang Mindt, Erlangen, Germany, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Aug. 1, 1974, Ser. No. 493,583
Claims priority, application Switzerland, Aug. 6, 1973, 11351/73
Int. Cl.² G01N 27/46
U.S. Cl. 204—195 P **9 Claims**



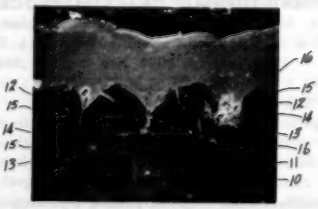
1. A device for measuring the concentration of substrates of enzyme reactions occurring during intermediate metabolism, more particularly the concentration of lactate and glucose in fluid biological samples, including a measuring cell formed as a tubular chamber for receiving the fluid sample, an enzyme electrode containing a platinum or gold electrode, an enzyme layer and a semi-permeable membrane covering the enzyme layer; a reference electrode; said tubular chamber being placed between the contact surfaces of said electrodes; and an electrical circuit for measuring the current which flows through the platinum or gold electrode,

which device is characterized in that it comprises means for locally regulating the temperature of the enzyme layer, a hydraulic device for alternately filling the measuring cell with an acceptor-containing buffer solution or a fluid sample, and said electrical current measuring circuit includes an electronic circuit which, after the measuring cell has been filled with a fluid sample, determines the peak value of the current flowing through the platinum or gold electrode, the peak value, being representative of the concentration of substrate to be measured.

4,005,003
MULTI-COMPONENT METAL ELECTRODE

James M. Popplewell, Guilford; Michael J. Pryor, Woodbridge, and Alexander F. Beck, Hamden, all of Conn., assignors to Olin Corporation, New Haven, Conn.

Filed Apr. 15, 1975, Ser. No. 568,353
Int. Cl.² C25B 11/10
U.S. Cl. 204—290 F **10 Claims**



1. A multi-component metal electrode comprised of

a. a film-forming metal base having
b. a coating comprised of
1. a porous oxide of a film-forming metal containing radial cracks and being partially detached from said film-forming metal base,
2. a ruthenium oxide-containing conductive oxide, and
3. a chemically resistant metal oxide derived from an inorganic compound comprising at least part of said conductive oxide.

4,005,004

ELECTRODE COATING CONSISTING OF A SOLID SOLUTION OF A NOBLE METAL OXIDE, TITANIUM OXIDE, AND ZIRCONIUM OXIDE

Maomi Seko, Tokyo; Shinsaku Ogawa, Nobeoka; Mitsuo Yoshida, Nobeoka, and Akira Nakamura, Nobeoka, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Sept. 10, 1975, Ser. No. 611,889
Claims priority, application Japan, Sept. 27, 1974, 49-11105
Int. Cl.² C25B 11/10
U.S. Cl. 204—290 F 16 Claims

1. An electrode comprising an anti-corrosive conductor having a coating of a solid solution containing at least one noble metal oxide together with titanium oxide and zirconium oxide, the total amount of titanium oxide plus zirconium oxide being from 1 to 50 %; said total amount containing from 0.5 to 49.5 mol % titanium dioxide and 0.5 to 49.5 mol % zirconium oxide.

4,005,005

PROCESS FOR RECOVERING AND UPGRADING HYDROCARBONS FROM TAR SANDS

John D. McCollum, and Leonard M. Quick, both of Naperville, Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Continuation of Ser. No. 474,907, May 31, 1974, abandoned. This application Mar. 4, 1976, Ser. No. 664,015
Int. Cl.² C10G 1/04
U.S. Cl. 208—11 LE 12 Claims

1. A process for recovering upgraded hydrocarbons from tar sands solids, comprising removing, cracking, desulfurizing, and demetalating hydrocarbons from the tar sands solids by contacting the tar sands solids with a water-containing fluid under super-atmospheric pressure, at a temperature in the range of from about 600° F. to about 900° F., in the absence of externally supplied catalyst and hydrogen, wherein sufficient water is present in the water-containing fluid and said pressure is sufficiently high so that the water in the water-containing fluid has a density of at least 0.10 gram per milliliter and serves as an effective solvent for the removed hydrocarbons; and lowering said temperature or pressure or both, to thereby make the water in the water-containing fluid a less effective solvent for the removed hydrocarbons and to thereby form separate phases.

4,005,006

COMBINATION RESIDUE HYDRODESULFURIZATION AND THERMAL CRACKING PROCESS

Angelo A. Montagna, Monroeville, Pa., assignor to Gulf Research & Development Company, Pittsburgh, Pa.

Filed July 18, 1975, Ser. No. 597,398
Int. Cl.² C10G 23/00
U.S. Cl. 208—89 9 Claims

1. A process comprising passing an asphaltene-containing residual oil containing metals and sulfur together with hydrogen downflow through initial and final catalytic hydrodesulfurization zones in series to produce a relatively low sulfur hydrodesulfurization effluent, passing a portion of the hydrodesulfurized oil flowing between said hydrodesulfurization zones through a thermal cracking zone containing a fixed bed of inert solids at a temperature from 750° to 1,000° F. which is above the hydrodesulfurization temperature to produce thermally cracked light oil and thermally cracked relatively high sulfur heavy oil containing less than 7 weight percent pentane insolubles, separating thermally cracked light oil from said relatively high sulfur cracked heavy oil, and blending at least a portion of said relatively high sulfur thermally cracked heavy oil with at least a portion of said relatively low sulfur hyrodesulfurization effluent.

4,005,007

HYDROCARBONACEOUS BLACK OIL CONVERSION PROCESS

Mark J. O'Hara, Mt. Prospect, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 428,280, Dec. 26, 1973, Pat. No. 3,909,450. This application July 28, 1975, Ser. No. 599,562
Int. Cl.² C10G 23/02; B01J 27/24
U.S. Cl. 208—111 7 Claims

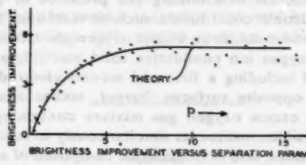
1. A process for the conversion of an asphaltene-containing hydrocarbonaceous charge stock which comprises reacting said charge stock and hydrogen in contact with a catalytic composite, said composite consisting essentially of a Group VI-B metal oxide and a Group VIII metal oxide impregnated on a refractory inorganic oxide carrier material, improved by further impregnating a nitrogen-containing organic compound on said carrier material to deposit from about 0.3 to about 0.6 wt. % nitrogen thereon, and effecting thermal decomposition of said compound and adsorption of nitrogen on said carrier material, said nitrogen-containing compound being characterized by a basic dissociation constant of less than about 1×10^{-13} at 25° C.

4,005,008

APPARATUS FOR MAGNETIC BENEFICIATION OF PARTICLE DISPERSION

Robin R. Oder, San Francisco, Calif., assignor to J. M. Huber Corporation, Locust, N.J.

Continuation of Ser. No. 495,712, Aug. 8, 1974, abandoned. This application July 25, 1975, Ser. No. 599,226
Int. Cl.² B03C 1/02
U.S. Cl. 209—223 R 5 Claims



1. In a system for effecting magnetic separation of magnetically attractable particles of magnetic susceptibility Q and mean diameter d from a dispersion of viscosity η of said particles in a fluid carrier, said system being of the type including a non-magnetic canister, means for generating a magnetic field of intensity H, means disposing said canister in said field, a ferro-magnetic filamentatious matrix within said canister, and means for flowing said dispersion through said canister and matrix, and providing a retention time of τ in said matrix; the improvement wherein:

said canister is packed with filamentatious material of magnetization M and filaments of generally circular cross-section with a mean filamentary diameter D, which material occupies a fraction X of said canister volume; said parameters M, D and X being selected in accordance with the relationship $C_0/C = e^{-\alpha P}$, where α is a numerical coefficient characteristic of the system, and p is the system

separation parameter and interrelates said parameters by the expression:

$p=(\eta^{Q}(d/D)^{2}M\tau HX(1-X)$.

4,005,009

METHOD OF TREATING WASTE WATER CONTAINING SURFACTANT AND HEAVY METALS

Mototaka Kinoshita, Kashiwa; Yoshimitu Sekiguchi, Ichikawa, and Susumu Ando, Chiba, all of Japan, assignors to Lion Fat & Oil Co., Ltd., Tokyo, Japan

Filed Mar. 5, 1975, Ser. No. 555,572

Claims priority, application Japan, Mar. 14, 1974, 49-28521

Int. Cl.² B03D 1/02

U.S. Cl. 210—44 3 Claims

1. A method of treating waste water from metal processing operations, said waste water containing from 3 to 20 ppm of heavy metals and from one to 20 ppm of anionic surfactant, which consists essentially of the steps of:

A. adding to said waste water from 30 to 1000 ppm of at least one inorganic coagulant selected from the group consisting of aluminum chloride, polyaluminum chloride, aluminum sulfate, ferrous chloride, ferric chloride, ferrous sulfate and ferric sulfate, and then adjusting the pH of said waste water to from pH 5 to pH 10, before any further treatment of said waste water, so that the surfactant reacts with said inorganic coagulant, and adding to said waste water from 200 to 5000 ppm of at least one inorganic salt selected from the group consisting of sodium sulfate, potassium sulfate, ammonium sulfate, sodium chloride, potassium chloride and ammonium chloride

B. after step A, adding to said waste water from one to 50 ppm of a cationic macromolecular coagulant selected from the group consisting of polyamine and polyethylene imine cationic coagulants, and

C. after step B, blowing air through said waste water to generate a foam so that the foams absorb said surfactant and heavy metals, separating the foam and recovering a treated waste water having a reduced content of said surfactant and heavy metals.

4,005,010

METHOD OF PACKING MEDIA IN A TOWER OR BED

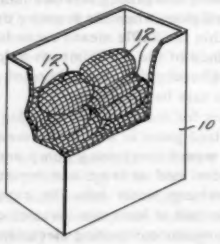
John Lunt, Alderley Edge, England, assignor to Imperial Chemical Industries Limited, London, England

Continuation-in-part of Ser. No. 499,991, Aug. 23, 1974, abandoned. This application Apr. 13, 1976, Ser. No. 676,658

Claims priority, application United Kingdom, Sept. 21, 1973, 44381/73

Int. Cl.² C02C 1/04; B01D 3/28

U.S. Cl. 210—17 3 Claims



1. A method of biologically treating effluent and sewage comprising the steps of

a. disposing a plurality of plastic elements as packing media in each of a plurality of open-weave or open-mesh sacks, the openings in said open-weave or open-mesh sacks being smaller than the smallest dimension of an individual plastic element,

b. filling a tower or bed with a plurality of said open-weave or open-mesh sacks containing said plastic elements therein, said plastic elements when wetted providing surfaces for growing bacteria and other micro-organisms as a biological film,

c. passing effluent and sewage through said packed tower or bed while supplying through said media and said sacks air required to sustain the growth of the bacteria and other micro-organisms on wetted packing element surfaces, and allowing the biological film to pass through said media and said sacks as it from time to time is dislodged, and

d. retaining said packing media containing sacks in place in said tower or bed for the effective life of said tower or bed.

4,005,011

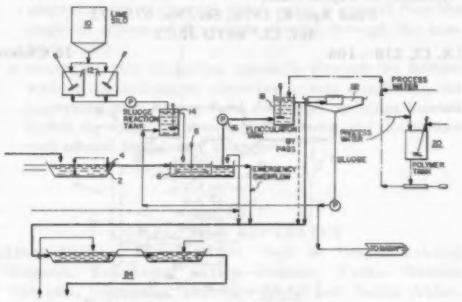
METHOD FOR TREATING EFFLUENT RESULTING FROM THE MANUFACTURE OF SYNTHETIC DYESTUFFS AND RELATED INTERMEDIATE CHEMICALS

Charles D. Sweeny, Loganton, Pa., assignor to American Color & Chemical Corporation, Lock Haven, Pa.

Continuation-in-part of Ser. No. 396,694, Sept. 13, 1973, abandoned. This application July 24, 1975, Ser. No. 598,687

Int. Cl.² C02C 5/02

U.S. Cl. 210—18 3 Claims



1. A method of treating an effluent which is an aqueous mixture containing environmentally significant amounts of organic solvents and byproducts of processes for the production of chromophoric compounds resulting from the manufacture of synthetic dyestuffs and related intermediate chemicals, said organic solvents and byproducts including toxic amounts of nitrobenzene and one or more heavy metals selected from the group consisting of mercury, iron, chromium, nickel, copper, lead, zinc, and arsenic, said process comprising:

a. subjecting said effluent to a first equalizing treatment;

b. chemically treating said equalized effluent with lime whereby toxic heavy metal impurities are reduced below a toxic level in said effluent and the effluent is neutralized;

c. adding a polymer flocculating agent and clarifying the thus equalized chemically treated effluent;

d. subjecting the thus clarified effluent to a second equalizing treatment;

e. subjecting the resultant mixture to carbon adsorption with activated carbon to remove color and whereby the level of nitrobenzene is reduced below about 12.0 mg/l;

f. biologically degrading the thus treated effluent with activated sludge containing microorganisms capable of biodegrading organic waste material; and

g. clarifying said biologically degraded effluent, whereby the color, TOC and BOD are reduced to a predetermined ecologically acceptable level.

4,005,012

SEMIPERMEABLE MEMBRANES AND THE METHOD FOR THE PREPARATION THEREOF

Wolfgang J. Wrasidlo, La Mesa, Calif., assignor to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Sept. 22, 1975, Ser. No. 615,252
Int. Cl.² B01D *13/04*
U.S. Cl. 210—23 H 7 Claims

1. In a process for desalination of saline water by reverse osmosis comprising contacting the saline water under pressure with a reverse osmosis membrane, the improvement comprising using as the reverse osmosis membrane a composite semipermeable membrane prepared by a method comprising the steps of:

a. treating a microporous substrate with an aqueous solution of an amine modified polyepihalohydrin,

b. immersing the resultant coated microporous substrate in a solution of a polyfunctional agent capable of reacting with the amine groups of said amine modified polyepihalohydrin to form an ultra-thin film on one surface of said microporous support, and

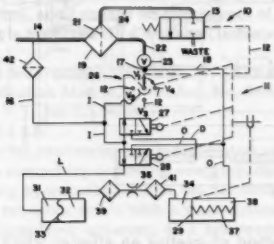
c. drying said composite semipermeable membrane at an elevated temperature.

4,005,013

DIFFERENTIAL CONTROLLER VALVE AND SEQUENCER

Melvin F. Hinton, La Jolla, Calif., assignor to Reed Irrigation Systems, El Cajon, Calif.

Filed Apr. 8, 1976, Ser. No. 675,072
Int. Cl.² B01D *35/22*
U.S. Cl. 210—106 16 Claims



1. In a liquid filtration system including a plurality of parallel filter assemblies connected to a common inlet source and a common outlet line, each filter assembly including a blow-down discharge valve which when opened is effective to clean the filter, such blow-down discharged valve being capable of being held closed by a predetermined minimum level of fluid pressure in a pilot line connected thereto, and opened by the relieving of such pressure, such pressure level being between atmospheric and that of the common inlet source, the improvement of a sequential blow-down controller, comprising:

means connecting each pilot line from the plurality of filters to the controller in a specified sequence of positions;

means receiving pressure from the common inlet source;

means monitoring the outlet pressure at the common outlet line;

means normally providing inlet source pressure in the pilot lines of the blow-down discharge valves;

means for sensing a predetermined pressure differential between the common inlet and the common outlet, indicating that at least one of the filter assemblies requires blow-down;

means for relieving the pressure in the blow-down pilot line of one of the filter assemblies in response to the sensing of said predetermined pressure differential and maintaining the pressure relief for a predetermined time period, thereby effecting blow-down of said one filter assembly for substantially said predetermined time period;

means for resupplying inlet source pressure in said one filter pilot line at the end of said predetermined time period; and

means for connecting the next pilot line in the sequence to said pressure-relieving means, following blow-down of said one filter assembly, for pressure relief of said next pilot line when said sensing means again determines that blow-down is required;

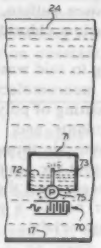
whereby blow-down of the filter assemblies continues in sequence until said predetermined pressure differential is eliminated by cleaning of at least one filter, and when the predetermined pressure differential again occurs, blow-down of at least one filter assembly again occurs, commencing with the filter assembly whose pilot line is next in sequence.

4,005,014

WATER TREATMENT SYSTEM WITH PROLONGED AERATION

Arnold Wikey, 5040 W. Newport, Chicago, Ill. 60641

Continuation of Ser. No. 470,794, May 17, 1974, abandoned.
This application Oct. 2, 1975, Ser. No. 618,885
Int. Cl.² C02C *1/10*
U.S. Cl. 210—192 3 Claims



1. A water treatment system for purifying and aerating water, by exposing the water to a pressurized oxygenated atmosphere,

said water treatment means comprising the combination of:

diffusion means for diffusing bubbles of oxygen in the water being purified and aerated,

baffle means comprising at least one inverted container,

said baffle means positioned a fixed distance below the surface of the water and arranged to capture the gases being diffused through the water,

said baffle means comprising means enabling the escape of said captured gases when the pressure due to the build up of gases within the baffle means exceeds the pressure due to the distance of the baffle means below the surface of the water, whereby the atmosphere of pressurized gases builds up in said baffle means,

aeration means for mechanically aerating the water within the pressurized gases in said baffle means,

said aeration means comprising pump and spray apparatus located under said at least one inverted container for spraying ambient water into the captured pressurized gases within said at least one inverted container, and

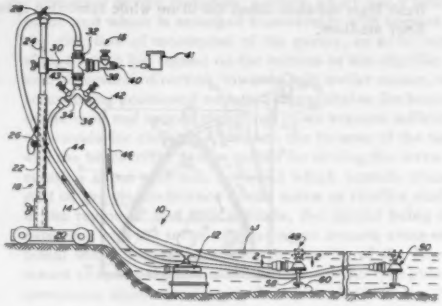
said diffusion means comprising electrolysis means located under said at least one inverted container,

said electrolysis means comprising platinum plated titanium electrodes, simultaneously providing an oxygenated atmosphere under said baffle means by breaking down the water into extremely small bubbles of its component gases, aerating the water by diffusion, and maintaining the pressurized gases in said baffle means.

4,005,015
AERATING APPARATUS

James F. Boward, Jr., 4020 Locust Lane, Harrisburg, Pa. 17109

Filed June 5, 1975, Ser. No. 584,087
Int. Cl.² B01F 3/04
U.S. Cl. 210—220 9 Claims



1. Apparatus for aerating bodies of water comprising a pump having an inlet and one outlet, a first conduit having one end connected to said pump outlet, valve means coupled to the other end of said first conduit to allow a fluid at atmospheric pressure to be introduced into said first conduit, structure for supporting said valve means and said other end of said first conduit at an elevation above water level with said other end of said first conduit at an elevation above water level with said other end of said first conduit being directed downwardly, distribution conduit means having a greater flow capacity than said first conduit, said distribution conduit means having one end communicating with said first conduit downstream from said valve means for receiving water and any fluids introduced thereinto through said valve means, and an upwardly directed submersible distributor head connected to the other end of said distribution conduit means, said distributor head having a chamber therein, said chamber having an inlet and an outlet, said chamber inlet being at an elevation below the elevation of said chamber outlet and being connected to said distribution conduit means for receiving water and fluid introduced through said first conduit therein, said chamber outlet being substantially smaller in size as compared with said chamber inlet for permitting discharge of water and said fluid vertically upwardly from said distributor head.

4,005,016
APPARATUS FOR CONTINUOUSLY WITHDRAWING SOLIDS WHICH FORM A SEDIMENT IN A LIQUID

Egon Haese, Bochum, and Hans Moll, Marl, both of Germany, assignors to Dr. C. Otto & Comp. G.m.b.H., Bochum, Germany

Filed July 7, 1975, Ser. No. 593,321
Claims priority, application Germany, July 12, 1974, 2433598
Int. Cl.² B01D 15/02
U.S. Cl. 210—268 10 Claims

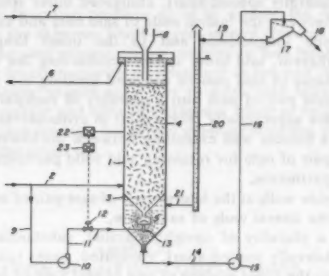
1. An apparatus to continuously withdraw solid particles from a liquid-filled processing chamber into a liquid-filled collecting chamber, said solids forming a sediment in the liquid, said apparatus comprising the combination of:

a vertically-extending container including means to introduce solid particles to said container, means to withdraw solid particles from from said container, means to introduce liquid to said container and means to withdraw liquid from said container

a funnel-shaped plate extending in an oblique downward direction within the bottom portion of said container in a manner to thereby define in said container a processing chamber above said plate and a collecting chamber below said plate, said funnel-shaped plate including a downwardly-extending central outlet nozzle,

an inverted bell-shaped chamber having a bottom wall joined with an upwardly-extending side wall forming an open top, the bell-shaped chamber being disposed within said collecting chamber centrally below the discharge end of said outlet nozzle,

a mushroom-shaped distributor spaced above the bottom wall of said bell-shaped chamber and spaced inwardly from the side walls thereof, the distributor having a generally cone-shaped upper surface with the apex thereof lying at the discharge end of said outlet nozzle, the upper surface of said distributor being inclined at an angle with respect to the horizontal which angle is greater than the angle of repose of the solids passing through the container, and

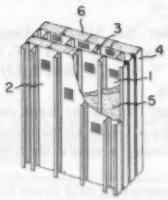


a conveying pipe projecting upwardly through the bottom wall of the bell-shaped chamber to said distributor, the conveying pipe having fluid discharge openings located within the space between said distributor and the bottom wall of said bell-shaped chamber.

4,005,017
CONTACTING APPARATUS

Kazuto Kusano; Hiroshi Ando, both of Tokyo; Takashi Kagami, Yokohama; Azusa Uchida, Zushi; Noboru Akiyama, Izumisano; Yoshihiro Ueda, and Yoshio Akiba, both of Kasukabe, all of Japan, assignors to Japan Gasoline Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 426,224, Dec. 19, 1973, abandoned.
This application July 25, 1975, Ser. No. 599,030
Claims priority, application Japan, Dec. 25, 1972, 47-147704
Int. Cl.² B01D 23/10
U.S. Cl. 210—284 6 Claims



1. An apparatus for contacting a fluid with a solid, comprising:

an elongated upright housing which is open at its opposite longitudinal ends so that a fluid can be flowed into one end thereof and discharged from the opposite end thereof;

a multi-layer network structure disposed in said housing and

defining a plurality of upright, parallel, spaced-apart zones filled with solid particles, said network structure also defining a plurality of upright, parallel, spaced-apart, fluid flow passages respectively disposed between each pair of adjacent zones, said network structure consisting of a plurality of like units disposed in side-by-side relation, each of said units consisting of

1. a pair of upright, spaced-apart, rectangular, flat, fluid-permeable nets of the same size disposed in parallel to each other, extending longitudinally in said housing and defining a single zone,
2. a plurality of upright, parallel, substantially uniformly laterally spaced-apart, elongated inner spacers disposed between the lateral ends of said nets and extending from one longitudinal end to the other longitudinal end thereof, said inner spacers contacting the opposing surfaces of said pair of nets and dividing the zone between said pair of nets into a plurality of compartments which are substantially rectangular in cross-section,
3. a bottom wall extending between the lower ends of said pair of nets for retaining said solid particles in said compartments,
4. side walls at the lateral ends of said pair of nets for closing the lateral ends of said zone,
5. a plurality of upright, parallel, substantially uniformly laterally spaced-apart, elongated, outer spacers attached to the outer surface of one of said pair of nets, said outer spacers being located between the lateral ends of said one net and extending between and contacting said outer surface of said one net of one unit and the outer surface of a net of the adjacent unit defining the opposite side of the adjacent zone, said outer spacers extending parallel to said inner spacers and extending from one longitudinal end to the other longitudinal end of said nets, said outer spacers dividing the space between two adjacent zones into a plurality of fluid flow passage sections which are substantially rectangular in cross-section, said outer spacers being disposed laterally offset from and located approximately midway between and spaced from adjacent inner spacers with said one net being exposed between adjacent inner and outer spacers so that each flow passage section overlaps and communicates through said one net with two of said compartments and vice versa,
6. further side walls at the lateral ends of the space between two adjacent zones for closing the lateral ends of said fluid flow passages, said fluid flow passages being open at the upper and lower ends thereof, whereby the fluid flows longitudinally through said sections and is adapted to contact the solid particles in said compartments.

4,005,018

LIQUID FILTERING APPARATUS

Floyd H. Wyman, Mauldin, and John E. Chambers, Travelers Rest, both of S.C., assignors to Thermo-Kinetics, Inc., Greenville, S.C.

Continuation of Ser. No. 319,748, Dec. 29, 1972, abandoned. This application May 29, 1975, Ser. No. 581,865

Int. Cl.² B01D *33/02*

U.S. Cl. 210—386 **2 Claims**

1. A liquid filter for use at least partially submerged in a tank containing liquid with contaminants therein including:

A. a drum defining a space therein for receiving filtered liquid;

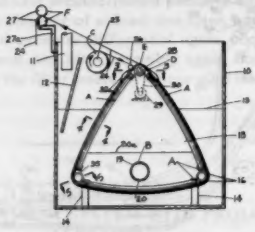
B. means for supporting said drum for rotation in the tank at least partially submerged within the liquid therein;

C. power operated means for supplying an elongated sheet of filter medium about the drum to exclude liquid from the space within the drum except through said filter medium;

D. filter medium support means extending about and carried by said drum permitting liquid after passing through the filter medium to collect at a bottom portion within the drum;

E. an outlet communicating with the filtered liquid within the drum adjacent the bottom portion of the drum for removing filtered liquid therefrom maintaining a liquid level outside the drum higher than a liquid level within the drum;

F. a driving means having driving connection adjacent the periphery of said drum exteriorally of said tank for rotating the drum independently of the filter medium moving fresh filter medium about the drum while removing spent filter medium;



G. sealing means including a flange carried by the tank defining an opening therein, and rotary sealing means carried by said flange within which said drum rotates, separating said driving means from said filtered liquid,

H. means below said flange receiving filtered liquid from said drum through said opening; and

I. squeeze rolls driven by said power operated means between which said spent filter medium is passed after liquid contact for compacting the filtered-out material and removing excess liquid from said filter media.

4,005,019

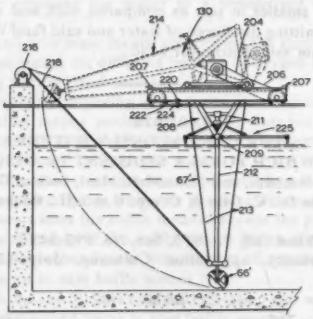
GRAVITATIONAL SEPARATOR

Joseph N. Parlette, Pickering Village, Canada, assignor to L.S. Love & Associates Limited, Brampton, Canada

Continuation-in-part of Ser. No. 509,779, Sept. 27, 1974, abandoned. This application Aug. 11, 1975, Ser. No. 603,888

Int. Cl.² B01D *21/12*

U.S. Cl. 210—525 **4 Claims**



1. A clarifier for use in the gravity separation of suspended particles from a liquid, the clarifier including:

a tank for receiving liquid to be clarified, the tank being of rectangular shape in plan and including a bottom having sludge outlet means through which settled sludge can be removed;

a gantry supported for movement above the surface of liquid in the tank;

gantry drive means adapted to cause the qantry to reciprocate from end to end of the tank in the performance of repeated passes over said liquid surface;

a sludge conveyor device which is submerged in liquid in the tank in use at a clearance above the bottom of the tank;

support means coupling the conveyor device to the gantry so that the device moves with the gantry and sweeps over the bottom surface of the tank as the gantry performs said repeated passes above the surface of the liquid in the tank;

the conveyor device including: a screw which has a helical blade and which is arranged transversely with respect to the direction of movement of the gantry, so as to move sludge which has settled on the bottom of the charifier in said transverse direction towards said outlet means, the screw being positioned with its axis parallel to the bottom of the tank and spaced therefrom by an amount sufficient to provide for clearance between the bottom of the tank and the blade of the screw; means for driving the screw in rotation about said axis; a shroud which extends around part of the circumference of the screw to confine sludge in the region of said helical blade, the shroud being coextensive with the screw and having an arcuate cross-sectional shape corresponding to the profile of the screw; means coupling the shroud with the screw for free pivotal movement about the longitudinal axis of the screw between two operative positions in each of which the shroud trails with respect to the direction of movement of the gantry so that a leading portion of the screw is exposed for action or sludge in its path; and shroud reversing means located at each end of the clarifier and adapted to engage the shroud as it approaches the reversing means and to restrain the shroud as it moves away from the reversing means each time the gantry reverses its direction of movement in reciprocating from end to end of the tnak, whereby the shroud is caused by said reversing means to automatically move into the other of its two positions.

3. A clarifier for use in the gravity separation of suspended particles from a liquid, the clarifier including:

a tank which is of rectangular shape in plan and which includes a bottom surface having sludge outlet means through which settled sludge can be removed from the tank;

a gantry supported for movement above the surface of liquid in the tank;

gantry drive means adapted to cause the gantry to reciprocate from end to end of the tank in the performance of repeated passes over said liquid surface;

a sludge conveyor device which is submerged in liquid in the tank in use at a clearance above the bottom of the tank;

conveyor drive means coupled to the sludge conveyor device;

support means coupling the conveyor device to the gantry so that the device moves with the gantry and sweeps over the bottom of the tank as the gantry performs said repeated passes above the surface of the liquid;

the conveyor device having at least one sludge-contacting surface which, when the device is in operation, moves in a direction transverse to the direction of movement of the gantry and towards said outlet means;

a scum box positioned at one end of the tank;

scum skimming means including: at least one skimmer blade which extends transversely with respect to the direction of movement of the gantry; a pair of elongate blade support elements which are spaced longitudinally of said blade and which have outer ends coupled to the blade and inner ends coupled to the gantry for pivotal movement about a horizontal axis so that the blade is movable between a normal skimming position and an elevated position clear of the surface of liquid in said tank; and means biassing the blade into said normal skimming position;

the scum box including a ramp positioned in the path of said skimming blade and arranged to lift the blade from said skimming position to said elevated position when the blade approaches said scum box as a result of movement of the gantry towards the box when the clarifier is in use; and,

in association with at least one of said elongate blade support elements, locking means for retaining the skimmer blade in said elevated position during movement of the gantry in a direction away from said scum box, said locking means being disposed above the liquid in the clarifier and including: detent means coupled to said elongate blade support element and vertically movable in response to movement of said skimmer blade from said skimming position to said elevated position; a pivotally mounted latch coupled to said gantry and movable between an operative position for engagement with said detent means, and a release position; means biassing the latch into said operative position so as to engage the detent means as the skimmer blade moves to said elevated position in use; and release means coupled to said latch and operable by contact with an abutment at the end of said tank opposite to said scum box to move said latch said release position and allow the skimmer blade to return to its skimming position for return movement of the gantry towards the scum box.

4,005,020

PARAFFIN REMOVING COMPOSITIONS

Thomas H. McCormick, St. Louis, Mo., assignor to Petrolite Corporation, St. Louis, Mo.

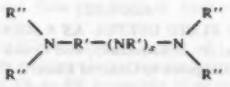
Filed July 19, 1973, Ser. No. 380,698

Int. Cl.² E21B *43/00*; **B08B** *7/00*

U.S. Cl. 252—8.55 B **12 Claims**

1. A composition for removing depositions of paraffin wax, asphaltic and bituminous organic solids and similar materials comprising a basic solution of oxyalkylated materials wherein (A) at least one of said oxyalkylated materials is an oxyalkylated amine and one other of said oxyalkylated materials is (B) a sulfated oxyalkylated fatty alcohol or salt thereof, which composition contains in addition to (A) and (B) a mixture of non-ionic oxyalkylates one of which is (C) an oxyalkylated alkyl phenol, each alkyl group having 1 to 18 carbon atoms, and the other of which is (D) ethylene glycol monobutyl ether, said oxyalkylated amine (A) being the product of oxyalkylation of an oxyalkylatable amine containing as the oxyalkylatable groups an oxyalkylatable amino or hydroxyl group, the amine being selected from the group consisting of

1. monoamines containing a monovalent hydrocarbon radical, a furyl, pyranyl, hydrogenated furyl or hydrogenated pyranyl radical attached to the amino nitrogen, any remaining valences of the amino nitrogen being satisfied by hydrogen,
2. piperidine, piperazine, or morpholine,
3. a polyamine of the formula



where R'' is hydrogen, alkyl, cycloalkyl, aryl or aralkyl, R' is a divalent alkylene radical of up to 6 carbon atoms and *x* is a number from 0 to 8, and

4. a monoacylated polyamine of the formula

$$RCONHR'(NR')_x\text{-}NH_2$$

where RCO is the acyl group of a 10 to 18 carbon fatty acid or is abietyl CO, and R' and *x* are as defined in (3) above, or such an amine containing a hydroxyl group and wherein the range of proportions of the components is as follows:

A. oxyalkylated amine, 15%–65%

B. sulfated oxyalkylated fatty alcohol, 15%–50%

C. oxyalkylated phenol, 15%–50%, and

D. ethylene glycol monobutyl ether, 5%–30%.

4,005,021

OIL-SOLUBLE REACTION PRODUCTS OF (A) A HIGH MOLECULAR WEIGHT OLEFIN POLYMER, ACRYLONITRILE, CHLORINE, AN AMINE AND MALEIC ANHYDRIDE, WITH (G) AN ALIPHATIC AMINES; AND LUBRICANT COMPOSITIONS CONTAINING THE SAME

Richard J. Lee, Downers Grove, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Division of Ser. No. 477,667, June 10, 1974, Pat. No. 3,914,203. This application Mar. 26, 1975, Ser. No. 562,270

Int. Cl.² C10M *1/32*

U.S. Cl. 252—51.5 A **7 Claims**

1. A lubricant composition comprising a major amount of a normally liquid oleaginous lubricant, and from about 0.1% to about 10% of the oil-soluble product obtained by the process comprising reacting (a) from about 0.3 moles to about 2.5 moles of a high molecular weight olefin polymer having an average molecular weight of at least 600, with from about 0.5 moles to about 7.5 moles of acrylonitrile, and from about 0.4 to about 2.0 moles of chlorine or bromine iodine catalyzed at a temperature of from about 60° F to about 160° F; (b) reacting, at a temperature of from about 200° F to about 350° F for a period of about 1 to 6 hours, the product of (a) with sufficient amount of primary aliphatic hydrocarbyl amine to replace the halogen atoms in the product of reaction (a); (c) reacting the product of (b) with from about 0.2 moles to about 1.5 moles of maleic anhydride at a temperature of from about 200° F to about 350° F for a period of about 2—4 hours; and (d) reacting at a temperature of from about 200° F to about 350° F, the product of reaction (c) with from about 0.2 moles to about 1.5 moles of primary aliphatic hydrocarbyl amine containing at least one primary amino group per anhydride function in the reaction product of (c).

4,005,022

ELECTROSTATIC LIQUID TONERS

Bheema R. Vijayendran, Bethel, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn.

Filed Feb. 25, 1974, Ser. No. 445,612

Int. Cl.² G03G *9/00*

U.S. Cl. 252—62.1 L **2 Claims**

1. In a liquid toner having as ingredients particles of carbon black pigment, aliphatic saturated hydrocarbon solvent and a resin soluble in the aliphatic saturated hydrocarbon, the improvement comprising: increasing the electrophoretic property of the carbon pigment particles by modifying the pigment surface with an organic modifying agent capable of modifying the carbon surfaces through doner/acceptor electron interactions by having a molecule structure containing at least three benzene rings and having a solubility of 0.03 to 6 grams per liter in the aliphatic saturated hydrocarbon solvent.

4,005,023

SILICONE FLUID USEFUL AS A BRAKE FLUID

Edgar D. Brown, Jr., Schenectady, and Frank J. Traver, Troy, both of N.Y., assignors to General Electric Company, Waterford, N.Y.

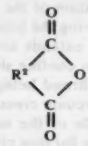
Continuation-in-part of Ser. No. 368,479, June 11, 1973, abandoned, which is a division of Ser. No. 290,075, Sept. 18, 1972, abandoned. This application Aug. 25, 1975, Ser. No. 607,494

Int. Cl.² C01M *3/44*

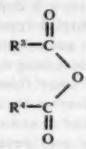
U.S. Cl. 252—78.3 **7 Claims**

1. A process for transmitting force through a hydraulic brake system having hydraulic activating means, hydraulic activated means and hydraulic line means connecting said hydraulic activating means with said hydraulic activated means comprising substantially filling said hydraulic activating means, said hydraulic activated means and said hydraulic lines with a hydraulic silicone fluid mixture having acceptable water tolerance and having therein a linear polymer silicone hydraulic fluid of the formula,

where *n* varies from 1 to 2000, R is methyl and the viscosity of said fluid varies from 20 to 500 centistokes at 25° C, where there is present at a concentration of 5 to 40% by weight of the total fluid of a water tolerance additive which is selected from the class consisting of compounds of the formula,



and of the formula,



where R^2 is a divalent hydrocarbon radical selected from the class consisting of alkylene and arylene radicals of 4 to 15 carbon atoms and R^3, R^4 are selected from the class consisting of monovalent hydrocarbon radicals and halogenated monovalent hydrocarbon radicals.

4,005,024

RINSE AID COMPOSITION CONTAINING AN ORGANOSILANE

Pedro A. Rodriguez, Forest Park; David C. Heckert, Oxford, and David M. Watt, Jr., Cincinnati, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

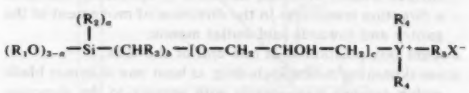
Filed Apr. 22, 1975, Ser. No. 570,939

Int. Cl.² C11D *9/36*

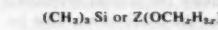
U.S. Cl. 252—89 R **23 Claims**

1. A rinse aid composition capable of imparting soil release properties to cooking utensils and tableware washed therewith consisting essentially of:

a. from 0.1% to 50% of an organosilane having the formula:



or is a siloxane oligomer thereof wherein R_1 is an alkyl group containing 1 to 4 carbon atoms,



where *x* is 2 to 4, *m* is 1 to 20, and Z is hydrogen, an alkyl group containing 1 to 18 carbons or an acyl group containing 1 to 4 carbon atoms; R_2 is an alkyl group containing 1 to 18 carbon atoms; *a* is 0 to 2; R_3 is hydrogen or an alkyl group containing 1 to 18 carbon atoms; *b* is 1 to 3; *c* is 0 or 1; R_4 is an alkyl, aryl or arylalkyl group containing 1 to 12 carbon atoms, a carboxy-substituted alkyl group containing 1 to 4 carbon atoms,

$(C_xH_{2x}O)_mZ$

where x, m and Z are as defined above, or oxygen provided only one R_4 is oxygen and further provided that there is no X^- when R_4 is oxygen; R_5 is an alkyl, aryl, or arylalkyl group containing 1 to 22 carbon atoms; X is halide; and Y is nitrogen, sulfur or phosphorus;

b. from 5% to 98.9% of a water-soluble organic nonionic detergent; and

c. from 1% to 40% of a monofunctional organic carboxylic acid containing 1 to 6 carbon atoms.

4,005,025

ORGANOSILANE-CONTAINING ANIONIC DETERGENT COMPOSITION

George Carl Kinstedt, Fairfield, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

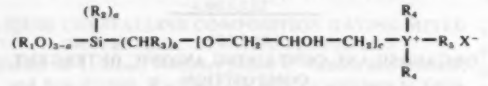
Filed May 5, 1975, Ser. No. 574,817

Int. Cl.² C11D 3/16, 3/36

U.S. Cl. 252—89 R **31 Claims**

1. A detergent composition capable of imparting soil release benefits to metallic and vitreous surfaces contacted therewith consisting essentially of:

a. an organosilane having the formula



or a siloxane oligomer thereof wherein R_1 is an alkyl group containing 1 to 4 carbon atoms or

$Z(OC_xH_{2x})_m$

where x is 2 to 4, m is 1 to 20, and Z is hydrogen, an alkyl group containing 1 to 3 carbons, or an acyl group containing 1 to 4 carbon atoms; R_2 is an alkyl group containing 1 to 18 carbon atoms; a is 0 to 2; R_3 is hydrogen or an alkyl group containing 1 to 18 carbon atoms; b is 1 to 3; c is 0 or 1; R_4 is an alkyl, aryl or arylalkyl group containing 1 to 18 carbon atoms, a carboxy-substituted alkyl group containing 1 to 4 carbon atoms,

$(C_xH_{2x}O)_mZ$

where x, m and Z are as defined above, or oxygen provided only one R_4 is oxygen and further provided that there is no X^- when R_4 is oxygen; R_5 is an alkyl, aryl or arylalkyl group containing 1 to 18 carbon atoms; X is bromide or chloride; and Y is nitrogen, sulfur, or phosphorus and the sum of the carbon atoms in R_2, R_3, R_5 and R_4 when R_4 is alkyl, aryl, arylalkyl or carboxy-substituted alkyl does not exceed 30 carbon atoms;

b. a water-soluble organic anionic detergent in a weight ratio of organosilane to detergent of from 1:1 to 1:10,000; and

c. a source of alkalinity in an amount such that the pH of a 0.2% aqueous solution of the composition lies in the range 8.5–10.5, said source being selected from the group consisting of water-soluble inorganic and organic bases.

4,005,026

DETERGENT COMPOSITIONS CONTAINING NOVEL CRYSTALLINE FORMS OF OPTICAL BRIGHTENERS

James C. Heath, Norwood; Raymond E. Werner, Blue Ash, both of Ohio; John W. Delaney, Fort Mitchell, Ky., and Nathan N. Crounse, Cincinnati, Ohio, assignors to Sterling Drug Inc., New York, N.Y.

Continuation-in-part of Ser. No. 834,560, June 18, 1969, Pat. No. 3,951,960, which is a continuation-in-part of Ser. No. 526,351, Feb. 10, 1966, abandoned, which is a continuation-in-part of Ser. No. 283,558, May 27, 1963, abandoned, which is a continuation-in-part of Ser. No. 177,743, March 6, 1962, abandoned. This application Sept. 5, 1975, Ser. No. 610,629

Int. Cl.² C11D 3/28, 7/32, 7/34

U.S. Cl. 252—89 B **3 Claims**

1. A detergent composition consisting essentially of a detergent and an effective brightening amount of the compound disodium 4,4′-bis(4,6-dianilino-s-triazin-2-ylamino)-2,2′-stilbenedisulfonate in the form of birefringent crystalline rods in which the lowest index of refraction has a value between 1.53 and 1.54 and is parallel to the long axis, said rods being characterized by the following X-ray diffraction data:

INTERPLANAR SPACINGS, A
6.23
5.90
5.70
5.59
5.51
5.34
4.90
4.85
4.60
3.98
3.82
3.64
3.44
3.28
3.22

4,005,027

SCOURING COMPOSITIONS

William L. Hartman, Cheviot, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 377,976, July 10, 1973, abandoned. This application Nov. 12, 1973, Ser. No. 415,033 The portion of the term of this patent subsequent to Oct. 12, 1993, has been disclaimed.

Int. Cl.² C11D 3/395

U.S. Cl. 252—95 **17 Claims**

1. An aqueous false body fluid hard-surface scouring cleanser comprising

A. from about 0.2% to 5% by weight of a bleaching agent which yields a hypochlorite species in aqueous solution;

B. from about 1% to 6% by weight of an inorganic colloid-forming clay selected from the group consisting of smectites, attapulgites and mixtures of smectite and attapulgites;

C. from about 0.1% to 3% by weight of a bleach-stable surfactant selected from the group consisting of water-soluble alkyl sulfates containing from about 8 to about 18 carbon atoms in the alkyl group;

D. from about 5% to 60% by weight of insoluble particulate abrasive material having particle diameters ranging from one micron to about 250 microns and a specific gravity of from about 0.5 to about 5.0;

E. from about 1% to 15% by weight of an inorganic buffering agent capable of maintaining composition pH within the range of from about 10.5 to 14; and

F. from about 10% to 80% by weight of deionized water.

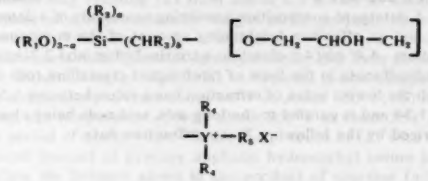
4,005,028
ORGANOSILANE-CONTAINING DETERGENT COMPOSITION

David C. Heckert, Oxford, and David M. Watt, Jr., Cincinnati, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Apr. 22, 1975, Ser. No. 570,534
Int. Cl.² C11D 7/56
U.S. Cl. 252—99 45 Claims

1. A detergent composition capable of imparting soil release benefits to metallic and vitreous surfaces contacted therewith consisting essentially of;

a. an organosilane having the formula



or is a siloxane oligomer thereof wherein R_1 is an alkyl group containing 1 to 4 carbon atoms,

$(CH_3)_2Si$ or $Z(OCH_xH_{2x})_m$

where x is 2 to 4, m is 1 to 20, and Z is hydrogen, an alkyl group containing 1 to 18 carbons or an acyl group containing 1 to 4 carbon atoms; R_2 is an alkyl group containing 1 to 18 carbon atoms; a is 0 to 2; R_3 is hydrogen or an alkyl group containing 1 to 18 carbon atoms; b is 1 to 3; c is 0 or 1; R_4 is an alkyl, aryl or arylalkyl group containing 1 to 12 carbon atoms, a carboxy-substituted alkyl group containing 1 to 4 carbon atoms,

$(C_xH_{2x}O)_mZ$

where x, m and Z are as defined above, or oxygen provided only one R_4 is oxygen and further provided that there is no X^- when R_4 is oxygen; R_5 is an alkyl, aryl or arylalkyl group containing 1 to 22 carbon atoms; X is halide; and Y is nitrogen, sulfur or phosphorus; and

b. a water-soluble organic detergent selected from the group consisting of nonionic, zwitterionic and ampholytic detergents and mixtures thereof in a weight ratio of organosilane to detergent of from 2:1 to 1:10,000.

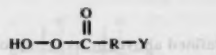
4,005,029
LAUNDERING ADJUNCT

J. Paul Jones, Springfield Township, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

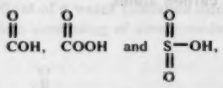
Continuation of Ser. No. 384,529, Aug. 1, 1973, abandoned, which is a continuation-in-part of Ser. No. 230,518, Feb. 29, 1972, abandoned. This application Mar. 10, 1976, Ser. No. 665,475
The portion of the term of this patent subsequent to Feb. 1, 1994, has been disclaimed.
Int. Cl.² C11D 7/38, 7/56
U.S. Cl. 252—99 17 Claims

1. A dye transfer inhibiting composition consisting essentially of:

a. from about 2% to about 75% by weight of a peroxygen compound selected from the group consisting of (1) water-soluble monopersulfates, (2) water-soluble monoperphosphates, (3) organic peroxyacids having the general formula



wherein R is selected from the group consisting of alkylene groups containing from about 1 to about 16 carbon atoms and arylene groups containing from about 6 to about 8 carbon atoms, and Y is selected from the group consisting of hydrogen, chlorine, methyl, phenyl,



(4) water-soluble salts of said peroxyacids, and (5) mixtures of compounds selected from groups (1) through (4);

b. from about 0.2% to 40% by weight of an activator compound selected from the group consisting of aldehydes, ketones, and compounds which yield aldehydes or ketones in aqueous solution, said activator producing a Relative Oxidation Constant of 0.25 or greater when the peroxygen compound is an inorganic persalt and a Relative Oxidation Constant of 25.0 or greater when the peroxygen compound is an organic peracid;

c. from about 2% to about 75% by weight of a zwitterionic surfactant which is a member selected from the group consisting of derivatives of: secondary amines; tertiary amines; heterocyclic secondary and tertiary amines; quaternary ammonium; quaternary phosphonium; and tertiary sulfonium compounds;

d. from about 1% to about 85% of a buffering compound capable of maintaining the pH of an aqueous solution of said dye transfer inhibiting composition within the range of from about 7 to about 12.

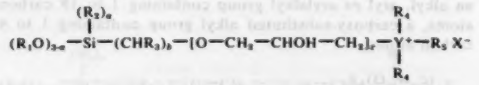
4,005,030
ORGANOSILANE-CONTAINING ANIONIC DETERGENT COMPOSITION

David C. Heckert, Oxford, and David M. Watt, Jr., Cincinnati, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Apr. 22, 1975, Ser. No. 570,533
Int. Cl.² C11D 3/12, 7/10
U.S. Cl. 252—140 26 Claims

1. A detergent composition capable of imparting soil release benefits to metallic and vitreous surfaces contacted therewith consisting essentially of:

a. an organosilane having the formula



or is a siloxane oligomer thereof wherein R_1 is an alkyl group containing 1 to 4 carbon atoms, or

$Z(OCH_xH_{2x})_m$

where x is 2 to 4, m is 1 to 20, and Z is hydrogen, an alkyl group containing 1 to 3 carbons or an acyl group containing 1 to 4 carbon atoms; R_2 is an alkyl group containing 1 to 12 carbon atoms, a is 0 to 2; R_3 is hydrogen or an alkyl group containing 1 to 12 carbon atoms, b is 1 to 3; c is 0 or 1; R_4 is an alkyl, aryl or arylalkyl group containing 1 to 12 carbon atoms, a carboxy-substituted alkyl group containing 1 to 4 carbon atoms,

$(C_xH_{2x}O)_mZ$

where x, m and Z are as defined above, or oxygen provided only one R_4 is oxygen and further provided that there is no X^- when R_4 is oxygen; R_5 is an alkyl, aryl or arylalkyl group containing 1 to 12 carbon atoms; X is halide; and Y is nitrogen, sulfur or phosphorus and the sum of the carbon atoms in R_2, R_3, R_5 and R_4 when R_4 is alkyl, aryl, arylalkyl or carboxy-substituted alkyl does not exceed 20 carbon atoms; and

b. a water-soluble organic anionic detergent in a weight ratio or organosilane to detergent of from 1:1 to 1:10,000.

4,005,031

NICKEL PEROXIDE OXIDIZING AGENT

Joseph Donald Surmatis, West Caldwell, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation of Ser. No. 350,281, April 11, 1973. This application Feb. 19, 1976, Ser. No. 659,459

Int. Cl.² C07B *3/00*; C01B *15/04*

U.S. Cl. 252—186 **13 Claims**

1. A process for preparing nickel peroxide oxidizing agent, comprising: treating nickel oxide, deposited on fine, free-flowing graphite, with an alkali hypohalite or alkali persulfate in an aqueous alkaline medium.

9. In a process for oxidizing unsaturated alcohols in an inert organic solvent medium with a nickel peroxide oxidizing agent prepared by treating nickel oxide with an alkali hypohalite or an alkali persulfate in an aqueous alkaline medium, the improvement which comprises:

depositing said nickel oxide onto fine free-flowing graphite prior to said treatment.

4,005,032

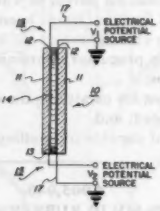
LIQUID CRYSTALLINE COMPOSITION HAVING MIXED CHOLESTERIC-NEMATIC PROPERTIES

Werner E. L. Haas, Webster; James E. Adams, Jr., Ontario, and Bela Richter, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 509,056, Sept. 25, 1974, Pat. No. 3,947,183. This application Nov. 20, 1975, Ser. No. 633,896

Int. Cl.² C09K *3/34*; G02F *1/13*

U.S. Cl. 252—299 **1 Claim**



1. A liquid crystalline composition having mixed cholesteric-nematic properties, comprising: about one part by weight p-[N-p-butoxybenzylidene) amino] phenylacetate; about one part by weight p-anisalamino-phenylacetate about two parts by weight p-anisalamino valerophenone; about one part by weight of a mixture of about 65% by weight N-(p-ethoxybenzylidene)-butylaniline and about 35% by weight N-(p-methoxy-benzylidene) -p-butylaniline; and, up to about 5% by weight of an optically active material selected from the group consisting of cholesteryl chloride; cholesteryl erucate; cholesteryl-2-(2-ethoxy) ethyl carbonate; and cholesteryl geranyl carbonate.

4,005,033

RESILIENT ORGANIC MICROSPHERES IN MASTIC ADHESIVES, SEALANTS, CAULKS, COATING COMPOUNDS AND RELATED PRODUCTS, AND METHODS OF MANUFACTURE

Phillip Carl Georgeau, and Lester I. Winebrenner, both of Kalamazoo, Mich., assignors to Champion International Corporation, Stamford, Conn.

Filed May 17, 1973, Ser. No. 361,364

Int. Cl.² C08J *9/32*, *9/22*

U.S. Cl. 260—2.5 B **5 Claims**

1. Process for the preparation of a mastic adhesive composition which comprises subjecting an aqueous slurry of hollow, resilient expandable thermoplastic resinous microspheres formed of an expandable copolymer or vinylidene chloride and acrylonitrile having a diameter of about 6 to 8 microns and having incorporated therein a volatile liquid blowing agent for said thermoplastic resin, to a temperature of about 80° to 140° C. for a period of about 1 to 3 seconds whereby the blowing agent is converted to a gas causing the microspheres to expand, and then quenching to 50° to 65° C. with an aqueous mastic composition to increase the volume and decrease the weight of said adhesive.

4,005,034

POLY(HALOETHYL-ETHYLENEOXY) PHOSPHORIC ACID ESTER POLYMERS AS FLAME RETARDANT AGENTS

Edward D. Weil, Hastings-on-Hudson, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 409,486, Oct. 25, 1973, Pat. No. 3,896,187, Continuation-in-part of Ser. No. 164,928, July 21, 1971, abandoned, Continuation-in-part of Ser. No. 760,988, Sept. 19, 1968, abandoned. This application Dec. 20, 1974, Ser. No. 535,004

Int. Cl.² C08K *5/51*, *5/52*; C08J *9/52*

U.S. Cl. 260—2.5 AJ **6 Claims**

1. A flame retardant composition comprising, in admixture, a polymeric material selected from the group consisting of polystyrene, polyolefines, vinyl polymers, rubber, nitrocellulose, epoxy resins, phenolic resins, acrylic resins, polyesters, cellulose acetate polymers, and polyurethane polymers in combination with liquid poly(chloroethylethyleneoxy) phosphoric acid esters which are prepared by reacting tris (2-chloroethyl) phosphate by heating said phosphate to a temperature within the range of from about 140° C. to about 220° C. in the presence of a basic catalyst with ethylene dichloride as reaction byproduct; and terminating said reaction at a reaction byproduct level of ethylene dichloride in an amount of from about 0.5 mole to about 0.9 mole ethylene dichloride per mole of tris(2-chloroethyl) phosphate in said reaction.

4,005,035

COMPOSITION FOR REINFORCED AND FILLED HIGH DENSITY RIGID POLYURETHANE FOAM PRODUCTS AND METHOD OF MAKING SAME

Dann T. Deaver, Harper Woods, Mich., assignor to Tecnik International Corporation, Mount Clemens, Mich.

Filed Dec. 24, 1974, Ser. No. 536,117

Int. Cl.² C08G *18/14*

U.S. Cl. 260—2.5 AK **20 Claims**

1. In a process for manufacturing in a mold a rigid polyurethane foam product having a density of from 10 to 80 lb/ft³ with said foam being formed from the reaction of an isocyanate component and a polyol component having a highly branched polyol having a molecular weight per branch of approximately 300 to 800 with at least one said component including a suitable blowing agent, the steps comprising: heating the polyol component and isocyanate component to a preselected temperature above 74° F, mixing the preheated polyol component and isocyanate component, mixing in silica sand and chopped glass fibers with the viscosity of the ad-

mixed components being in the range of from around 1200 cps to around 3600 cps, said chopped glass fibers being in the range of from 3 to 25% by weight of the foamed product, said silica sand being in the range of from 10 to 75% by weight of the foamed product, with the polyurethane being no less than about 20% by weight of the foamed product, said silica sand being of a mesh size of from No. 30 U.S. sieve to No. 200 U.S. sieve, said chopped glass fibers being 1/32" to 1" in length with each fiber being comprised of a plurality of filament strands, heating the mold to a temperature approximately at or above the temperature of the preheated materials, pouring the admixed components into the mold for foaming.

4,005,036

FROTHED MOLDING COMPOSITIONS

Joseph P. Stalego, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Apr. 25, 1974, Ser. No. 464,100

Int. Cl.[2] C08J *9/30*; **C08L** *61/04, 61/24, 61/34*

U.S. Cl. 260—2.5 F **13 Claims**

1. A frothed molding composition consisting essentially of a film of an uncured binder uniformly dispersed throughout a fibrous matrix of fibers wherein the molding composition is frothed in the presence of a frothing agent of salts of fatty acids wherein the composition comprises 35 to 95% by weight of solids of binder and 5 to 65% by weight of solids of fibers and wherein the uncured binder is a phenol-formaldehyde condensate, a phenol-aminoplast-formaldehyde condensate, an aminoplast-formaldehyde condensate, a furfuryl condensate, a furfuryl alcohol condensate, or a resorcinol-formaldehyde condensate.

4,005,037

POLYCARBONATE-POLYVINYL CHLORIDE MOULDING COMPOUNDS

Fritz Mietzsch; Dietrich Hardt, both of Cologne; Volker Serini, Krefeld; Herbert Bartl, Odenthal-Hahnenberg, and Hugo Vernaleken, Krefeld, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Jan. 14, 1975, Ser. No. 540,981

Claims priority, application Germany, Jan. 17, 1974, 2402177

Int. Cl.[2] C08L *7/00, 67/06*

U.S. Cl. 260—4 AR **14 Claims**

1. A process for the production of an aromatic polycarbonate-modified vinyl chloride polymer which comprises the radical polymerisation of a mixture of olefinically unsaturated monomers containing at least 70% by weight of vinyl chloride in the presence of at least one aromatic polycarbonate having an average molecular weight of from 10,000 to 200,000 and the addition of from 0-100% by weight, based on the aromatic polycarbonate-modified vinyl chloride polymer, of a rubber or a rubber-modified thermoplastic resin after polymerisation.

4,005,038

PAINT COMPOSITION CONTAINING DENATONIUM BENZOATE OR LIGNOCAINE BENZYL OCTANOATE WITH A LATEX RESIN BINDER FOR APPLICATION OVER OLD PAINT FILMS TO PREVENT INGESTION OF POISONS THEREFROM

Walter Minkoff, Rockville Center, N.Y., assignor to Peerless Paint and Varnish Corporation, Brooklyn, N.Y.

Continuation-in-part of Ser. No. 460,875, April 15, 1974, Pat. No. 3,935,137, which is a continuation of Ser. No. 345,071, March 26, 1973, abandoned, which is a continuation-in-part of Ser. No. 267,623, June 29, 1972, abandoned, which is a continuation-in-part of Ser. No. 115,796, Feb. 16, 1971, abandoned. This application Nov. 5, 1975, Ser. No. 628,931 The portion of the term of this patent subsequent to Jan. 27, 1993, has been disclaimed.

Int. Cl.[2] C08K *5/10*; **C08L** *1/26, 31/04*; **C09K** *3/00*

U.S. Cl. 260—17 R **11 Claims**

1. A coating composition for application to previously coated substrates consisting essentially of a paint containing 0.05% to 0.5% by weight of the non-volatile portion of said paint of a bitter tasting deterrent selected from the group consisting of at least one of denatonium benzoate and lignocaine benzyl octanoate; 9.0% to 99.5% by weight of a latex resin binder for controlling the amount of said deterrent released on contact with saliva; and an effective amount of a surfactant for stabilization of said paint, said coating composition having the visual appearance, durability, adhesion, toughness, washability and continuity of conventional paint and having a repulsive taste which discourages persons from licking, sucking, chewing, swallowing or otherwise mouthing said substrates.

4,005,039

CURABLE COMPOSITIONS FOR BULKING TIMBER COMPRISING (A) A MODIFIED POLYOL CONTAINING -0-3-ALKYLENEAMIDO GROUPS AND (B) AN AMINO RESIN PRECURSOR CONTAINING REACTIVE N-HYDROXYMETHYL GROUPS

Duncan Gardiner, St. Albans, England, assignor to Research Corporation, New York, N.Y.

Filed June 10, 1975, Ser. No. 585,527

Claims priority, application United Kingdom, June 28, 1974, 28902/74

Int. Cl.[2] C08L *5/00*

U.S. Cl. 260—17.3 **11 Claims**

1. A composition suitable for use in bulking timber comprising:

a. at least one modified polyol in which at least two of the free hydroxyl groups have been converted to -0-3-alkyleneamido ether groups;

b. an amino resin precursor containing reactive N-hydroxymethyl groups;

c. a curing catalyst for catalyzing the curing of the composition when heated; and

d. a polar solvent capable of swelling wood.

4,005,040

FOAMED AND SOLID RUBBER-STARCH GRAFT COPOLYMER COMPOSITIONS AND METHOD OF PREPARATION

George G. Maher, Dunlap, Ill., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Nov. 10, 1975, Ser. No. 630,373

Int. Cl.[2] C08L *3/06, 7/02*

U.S. Cl. 260—17.4 GC **32 Claims**

1. A method of preparing starch graft copolymers comprising the following steps:

a. Preparing an aqueous solution of an alkali metal salt of starch xanthate having a xanthate degree of subsitution of from 0.05 to 3, said aqueous solution having a pH of about 11;

b. Reacting in said aqueous solution hydrogen peroxide and a vinyl monomer with said starch xanthate to form a gel of starch graft copolymer, said starch xanthate, hydrogen peroxide, and vinyl monomer being present in amounts such that the pH of the resulting reaction media drops to a value of from about 2 to 7;

c. Recovering said starch graft copolymer.

4,005,041

AIR-DRYING OR HEAT-CURABLE POLYURETHANE COATING COMPOSITIONS

Kenneth Elliot Piggott, Durban, South Africa, assignor to Prolux Paint Manufacturers (PTY) Limited, Alrode, South Africa

Filed June 24, 1975, Ser. No. 590,013

Claims priority, application South Africa, June 25, 1974, 74/4071; June 25, 1974, 74/4072

Int. Cl.² C08G *18/12*; **C08L** *91/00*

U.S. Cl. 260—18 TN **15 Claims**

1. A process for the production of allyl ether group-containing isocyanate adducts useful in coating compositions, comprising reacting isophorone diisocyanate in the presence of a catalyst with a polyhydroxy compound in the proportion of substantially one mole of the diisocyanate to each hydroxyl group, and then condensing the product so obtained with an hydroxyl group-containing allyl ether of an aliphatic diol or polyol in an amount such that substantially one hydroxyl group in the allyl ether is used for each unreacted isocyanate in said product.

4,005,042

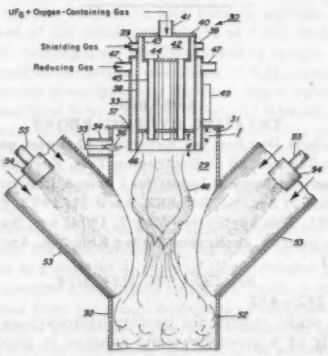
PROCESS FOR PRODUCING URANIUM RICH COMPOSITIONS FROM URANIUM HEXAFLUORIDE USING FLUID INJECTION IN THE POST OXIDATION STEP

Abdul Gaffar Dada, Wilmington, N.C., assignor to General Electric Company, San Jose, Calif.

Filed July 2, 1975, Ser. No. 592,507

Int. Cl.² C01G *43/02*

U.S. Cl. 252—301.1 R **14 Claims**



1. In the method of preparing a uranium oxide rich composition from uranium hexafluoride in a reaction zone in the presence of an active flame comprising the steps of introducing a first gaseous reactant comprising a mixture of uranium hexafluoride and an oxygen-containing carrier gas into the reaction zone, separately introducing a second gaseous reactant comprising a reducing gas into the reaction zone and separately introducing a shielding gas into the reaction zone between the first gaseous reactant and the second gaseous reactant which temporarily prevents substantial mixing and reaction between the first gaseous reactant and the second gaseous reactant until sufficient cross diffusion of the reactants and the shielding gas occurs as the reactants and the shielding gas pass through the reaction zone, resulting in a reaction producing a particulate uranium dioxide rich composition and gaseous reaction products, and introducing a third gaseous reactant comprising an oxygen-containing gas into contact with the particulate uranium dioxide rich composition and gaseous reaction products thereby converting the gaseous reaction products in the reaction zone to an oxidized form and oxidizing the uranium dioxide rich composition to a higher oxide of uranium, the improvement comprising the step of introducing an atomized fluid having a high latent heat of evaporation into the third gaseous reactant so that the third gaseous reactant envelopes the atomized fluid as it is introduced into the reaction zone and the atomized fluid is converted to a gas and cools the materials in the reaction zone.

4,005,043

PREPARATION OF COMPOSITION FOR CONVERTING HYDROCARBONS AND FATS INTO BIODEGRADABLE AQUEOUS EMULSIONS

Pierre Fusey, 8 Rue l'Abbe de l'Epee, Paris 5eme, France

Filed July 25, 1975, Ser. No. 599,164

Claims priority, application France, July 25, 1974, 74.25835

Int. Cl.² B01F *17/00*

U.S. Cl. 252—356 **7 Claims**

1. A process for the preparation of a composition for forming hydrocarbons or fats into a biodegradable emulsion, comprising admixing at ambient temperature more than one mole of a $C_6 - C_8$ carboxylic acid with a mole of a nitrogen compound selected from the group consisting of tertiary alkyl amines and tertiary alkanolamines, with the addition of 2 to 10% by weight of the composition of lecithin, adding ammonia to bring the mixture to a pH of from 7 to 9, and diluting the composition thus formed with a benzene-free petroleum solvent or water.

4,005,044

METHOD OF MAKING AQUEOUS ANTIFOAM COMPOSITIONS

William J. Raleigh, Watervliet, N.Y., assignor to General Electric Company, Waterford, N.Y.

Filed June 20, 1975, Ser. No. 588,700

Int. Cl.² B01D *19/04*

U.S. Cl. 252—358 **10 Claims**

1. A method of making a stable, emulsified antifoam composition, which comprises:

i. dissolving an emulsifying agent in water;

ii. dispersing a dimethylpolysiloxane fluid in the solution of the emulsifying agent;

iii. admixing a silazane-treated precipitated silica filler with the dispersion produced in step (ii); and

iv. milling the mixture of step (iii) until there is produced a composition which is homogeneous and incapable of separating into two layers.

4,005,045

METHOD FOR CARRYING OUT ENDOTHERMIC CHEMICAL REACTIONS WITH THE USE OF NUCLEAR REACTOR COOLING GASES

Egon Haese, Bochum-Linden, Germany, assignor to Dr. C. Otto & Comp. G.m.b.H., Bochum, Germany

Filed Aug. 15, 1973, Ser. No. 388,347

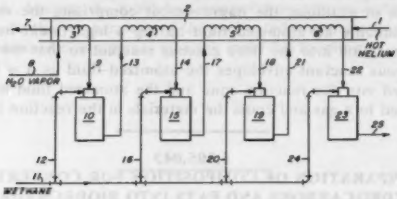
Claims priority, application Germany, Aug. 17, 1972, 2240355

Int. Cl.² C01B *2/16, 2/02*

U.S. Cl. 252—373 **9 Claims**

1. In the method for carrying out an endothermic chemical reaction of the type wherein a hydrocarbon fuel is dissociated by reaction with a gaseous medium and wherein a mixture of the gaseous medium and fuel are heated by a cooling medium from a nuclear reactor and passed through a plurality of serially-connected reaction chambers, the steps of:

1. passing said gaseous medium through a first heat exchanger to the first of said serially-connected reaction chambers while adding a portion of said fuel to the first reaction chamber,
2. passing the output of said first reaction chamber through a second heat exchanger and thence to a second of said reaction chambers while adding another portion of the fuel to the second reaction chamber,



3. repeating step (2) by passing the output of each reaction chamber through a heat exchanger and thence to a succeeding one of said serially-connected reaction chambers while adding a portion of the fuel to each reaction chamber, and
4. causing a cooling medium from said nuclear reactor to contact all of said heat exchangers whereby heat from the cooling medium is transferred via said heat exchangers to said reaction chambers to facilitate said endothermic chemical reaction.

4,005,046

CATALYSTS AND CARRIERS THEREFOR

Grish Chandra, Penarth, and Brian John Griffiths, Coytrahen, near Bridgend, Wales, assignors to Dow Corning Limited, Barry, Wales

Filed Nov. 6, 1975, Ser. No. 629,268

Claims priority, application United Kingdom, Nov. 12, 1974, 49028/74

Int. Cl.² B01J 31/02

U.S. Cl. 252—428 **6 Claims**

1. As a composition of matter an inorganic particulate solid having chemically bonded to the surface thereof at least one group of the general formula

wherein the R substituents are the same or different and are selected from the group consisting of a chlorine atom, a bromine atom, a monovalent radical having from 1 to 8 inclusive carbon atoms and free of aliphatic unsaturation which is a hydrocarbon radical, a halogenated hydrocarbon radical, an oxyhydrocarbon radical, an oxime radical having less than 14 carbon atoms, an oxygen atom and the radical $-NQ_2$, in which each Q represents a hydrogen atom or an alkyl or an aryl radical having less than 10 carbon atoms, R′ represents a divalent hydrocarbon radical having from 1 to 16 inclusive carbon atoms, R″ and R‴ represents a monovalent hydrocarbon radical free of aliphatic unsaturation and having from 1 to 8 inclusive carbon atoms and n is 0 or an integer of 1 to 20, the sulfur atom in said group being coordinatively bonded to an atom of platinum or rhodium.

4,005,047

CATALYTIC COMPOSITION AND ITS USE FOR POLYMERIZING CYCLOOLEFINS

Yves Chauvin, St. Germain en laye; Dominique Commereuc, Meudon; Daniel Cruypelinck, Nanteuil le Haudoin, and Jean-Pierre Soufflet, Chatou, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

Filed Feb. 4, 1975, Ser. No. 547,032

Claims priority, application France, Feb. 4, 1974, 74.03715; May 21, 1974, 74.18008; Nov. 20, 1974, 74.38111

Int. Cl.² C08F 4/22

U.S. Cl. 252—429 R **7 Claims**

1. A catalytic composition, particularly useful for polymerizing cycloolefins, consisting essentially of:

a. a compound of the formula

$$M(CO)_xL_z$$

or

$$L_z(CO)_{5-z}\text{-}MC(R)(R^1)$$

wherein

M is molybdenum or tungsten;

L is a hydrocarbyl amine, a hydrocarbyl ether, a hydrocarbyl nitrile, a hydrocarbyl ketone, pyridine, a hydrocarbyl pyridine, a hydrocarbyl phosphine, a hydrocarbyl arsine, a hydrocarbyl stibine, hexamethyl phosphoramide, or a phosphorus, arsenic or antimony trihalide;

R and R^1 are selected from the group consisting of the radicals R_1, OR_3, SR, NHR and NR_1R_2 in which R_1 and R_2 are hydrogen or hydrocarbyl radicals and R_3 is hydrogen, a hydrocarbyl radical or a quaternary hydrocarbyl ammonium group;

x is 0 or 1;

y is $6-zN$, N being the number of polar groups of L; and

z is 0 or an integer from 1 to 5; and

b. titanium tetrachloride, the molar ratio of (b) to (a) being 5 : 1 to 300 : 1 respectively.

4,005,048

TREATING HYDROCARBONS

Dennis Albert Dowden; Ian Robertson Shannon, and Michael Staines Spencer, all of Stockton-on-Tees, England, assignors to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 245,882, April 21, 1972, Pat. No. 3,857,901. This application May 7, 1974, Ser. No. 467,800

Claims priority, application United Kingdom, Apr. 27, 1971, 11548/71

Int. Cl.² C07C 3/58, 5/24

U.S. Cl. 252—432 **6 Claims**

1. An acidic catalyst for treating hydrocarbons consisting essentially of a crystalline solid solution in zirconia of an irreducible oxide of a lower valency metal selected from the group consisting of magnesium, aluminum, yttrium, calcium, manganese and rare earth metal, wherein the zirconia is present in solution in excess by atoms so that the crystal lattice of the zirconia is made defective by the presence of the oxide of the selected lower valency metal, the percentage by metal atoms of the selected lower valency metal in the solution being in the range 0.05% to 30%; and wherein the crystalline solid solution also contains an acidic co-catalyst in a proportion of 0.1 to 20% by weight, said co-catalyst being silica, boria or an ion selected from the group consisting of sulphate, chloride, fluoride, and phosphate, said ion being chemically combined with the solid solution.

4,005,049

SILVER CATALYSTS

Ellis K. Fields, River Forest, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed May 23, 1975, Ser. No. 580,683
Int. Cl.² B01J *23/66, 23/68*
U.S. Cl. 252—467 11 Claims

1. A silver/transition metal catalyst obtained by calcining the polysilver salt of a polycarboxylic acid and at least one transition metal salt of a polycarboxylic acid at temperatures from 200°–500°C under an inert gas and oxidizing the said calcined salts with oxygen at temperatures from 20°–500°C, the said polysilver salt being selected from the group consisting of aromatic polycarboxylic acids and heterocyclic polycarboxylic acids and the transition metal of said transition metal salt being selected from the group consisting of the metals of Groups IV-B, V-B, VI-B, VII-B, VIII and I-B of the Periodic Table.

4,005,050

TANTALUM OR NIOBIUM-MODIFIED RESISTOR ELEMENT

Ronald K. Stewart, Mount Clemens, and Robert H. Insley, Royal Oak, both of Mich., assignors to Champion Spark Plug Company, Toledo, Ohio

Filed Apr. 19, 1972, Ser. No. 245,511
Int. Cl.² H01B *1/06*
U.S. Cl. 252—521 7 Claims

1. A green ceramic article useful after firing as an electrical resistor element which is a modified stannic oxide semi-conductor, said article consisting essentially of stannic oxide, a modifying oxide selected from the group consisting of tantalum pentoxide, and niobium pentoxide, a barium, calcium or strontium compound, a boron compound and silica, the amount of said modifying oxide, based on the total weight of the article, when tantalum pentoxide, ranging from 1 to 18 percent by weight and, when niobium pentoxide, ranging from ½ to 5 percent by weight, the total barium, calcium or strontium content of the article, calculated as CaO, BaO, or SrO respectively, ranging from 1 to 26 percent by weight, the total boron content of the article, calculated as B_2O_3, ranging from 4 to 25 percent by weight, and the total silica, calculated as SiO_2, ranging from ½ to 4 percent by weight wherein a plot of the resistance versus the amount of the modifying oxide present in the fired resistor has a positive slope as the tantalum pentoxide varies from 1 to 18 percent or as the niobium pentoxide varies from ½ to 5 percent by weight of the green ceramic article.

7. A method for producing a sintered electrical resistor element, said method comprising the steps of preparing a batch which is a uniform mixture of finely divided particles, said batch consisting essentially of stannic oxide, a modifying oxide selected from the group consisting of tantalum pentoxide and niobium pentoxides, a barium, calcium or strontium compound, a boron compound and silica, the amount of said modifying oxide, based on the total weight of the batch, when tantalum pentoxide, ranging from 1 to 18 percent by weight and, when niobium pentoxide, ranging from ½ to 5 percent by weight, the total barium, calcium or strontium content, calculated as CaO, BaO or SrO respectively, ranging from 1 to 26 percent by weight, the total boron content of the batch, calculated as B_2O_3, ranging from 4 to 25 percent by weight, and up to 4 percent by weight silica, based upon the total weight of the batch, pressing a shape from the batch at a pressure of about 10,000 to 40,000 pounds per square inch, and firing the shape to a temperature within the range of about 2300°–2700° F. for a time sufficient to form said resistor element.

4,005,051

WATER-COMPATIBLE SOLVENTS FOR FILM-FORMING RESINS AND RESIN SOLUTIONS MADE THEREWITH

Josef Klemens Brunner, Scheuchzerstrasse 47, Zurich, Switzerland

Filed Nov. 4, 1974, Ser. No. 520,901
Claims priority, application Austria, Nov. 5, 1973, 9267/73
Int. Cl.² C09D *3/40, 3/48;* B01F *1/00*
U.S. Cl. 260—29.4 R 5 Claims

1. A water-miscible film-forming composition in the liquid state comprising one or more film-forming resins dissolved in a solvent, which solvent consists essentially, apart from any water content, of between 0.5 and 80% of at least one dimethyl ester of an aliphatic dicarboxylic acid which acid contains not less than four nor more than six carbon atoms, with the remainder of the non-water component or components of said solvent consisting of the methyl ester of 6-hydroxycaproic acid and at least one substance selected from the group consisting of monomethyl, monoethyl and monobutyl ethers of ethylene glycol, monomethyl, monoethyl and monobutyl ethers of diethylene glycol, and acetates of the aforesaid ethers of ethylene glycol and of diethylene glycol.

4,005,052

AQUEOUS POLYMERIZATION OF UNSATURATION CARBOXYLIC ACID MONOMERS USING ANIONIC SURFACTANT MIXED WITH THE MONOMER AND POLYHYDRIC ALCOHOL PRIOR TO REACTION

Kazys Sekmakas, Chicago, Ill., assignor to DeSoto, Inc., Des Plaines, Ill.

Filed June 9, 1975, Ser. No. 585,039
Int. Cl.² C08L *25/14*
U.S. Cl. 260—29.6 TA 12 Claims

1. A method of producing a dispersion of copolymer particles in water comprising, forming a liquid mixture of monoethylenic monomers and from 2% up to about 50%, based on the weight of said monomers, of water insoluble polyhydric alcohol selected from trihydric alcohols and tetrahydric polyhydric alcohols, said polyhydric alcohol having a molecular weight of from 300 up to about 6000, said mixture including from 1–30% of anionic surfactant, based on the weight of said polyhydric alcohol, said monomers including from about 1 to about 30% by weight of monoethylenic carboxylic acid, dispersing said mixture in water to form a dispersion, said dispersion including a free radical polymerization catalyst, subjecting the dispersed liquid mixture in said dispersion containing the said catalyst to agitation at an elevated polymerization temperature, with said monomers being in solution in the dispersed mixture, until polymerization of said monomers has been completed and copolymer particles have been formed, and then neutralizing at least 10% of the acidity in said copolymer particles with a base.

4,005,053

POLYMER-OIL-BLACK MASTERBATCH

George James Briggs; Ernest Jack Buckler, and Yung-Kang Wei, all of Sarnia, Canada, assignors to Polysar Limited, Sarnia, Canada

Filed May 27, 1975, Ser. No. 581,086
Claims priority, application Canada, June 25, 1974, 203375
Int. Cl.² C08F *216/04, 226/02;* C08K *5/01*
U.S. Cl. 260—33.6 AQ 17 Claims

9. An improved masterbatch of synthetic rubber, oil and carbon black which comprises 100 parts by weight of a synthetic C_4–C_8 conjugated diolefin polymer containing from 0.2 to about 2.5 weight percent of copolymerized monomer containing reactive groups selected from one of tertiary amine, hydroxyl and aldehyde, from about 50 to about 150 parts by weight of oil and from about 50 to about 250 parts by weight of carbon black and a sufficient amount of cross-linking agent to react with the reactive groups of the polymer to cause an improvement in the strength and non-flow characteristics of the polymer.

4,005,054

PRODUCTION OF POLYOLEFIN-REINFORCED RUBBER PRODUCTS

Alain Bonnefon, Espinay sur Seine, and Jack Benard, Asnieres, both of France, assignors to Pneumatiques, Caoutchouc Manufacture et Plastiques Kleber-Colombes, France

Filed Feb. 8, 1973, Ser. No. 330,619
Int. Cl.² C08J 3/22; C08L 7/00, 23/06
U.S. Cl. 260—42.56 17 Claims

1. A flexible, homogeneous rubbery product comprising a matrix of a rubber selected from the group consisting of a natural elastomer and a synthetic elastomer in which there is uniformly dispersed at least 5% by weight based on the weight of the elastomer of a crystalline polyolefin whose molecular weight is equal to or greater than 500,000, characterized in that the polyolefin is in the condiition of fine particles which are drawn out in the form of a plurality of elongated fibrils having a diameter smaller than 5 microns and a length on the order of from about 2 to 20 millimeters, said polyolefin fibrils being uniformly dispersed within the elastomer matrix with a dominant directional orientation thereby imparting to the product a very high resistance to elongation in accordance with the direction of orientation of the fibrils.

4,005,055

ANAEROBIC AMINIMIDE CURING COMPOSITIONS

Jerry Miron, Livingston; Manilal Savla, Parsippany, and Irving Skeist, Summit, all of N.J., assignors to Skeist Laboratories, Incorporated, Livingston, N.J.

Filed May 22, 1975, Ser. No. 580,047
Int. Cl.² C08F 120/02, 120/52, 124/00, 18/24
U.S. Cl. 260—47 UA 18 Claims

1. A sealant composition having extended shelf life in the presence of oxygen and being rapidly polymerizable upon the exclusion of oxygen which comprises a mixture of an unoxygenated aminimide monomer selected from the group consisting of (A) hydroxy substituted aminimides corresponding to the general formula $[CH_2{=}CR{-}CO{-}N^{-}{-}N^{+}(R_1R_2]n{-}R_3$, wherein n is an integer having a value of 1 or 2, R is hydrogen, loweralkyl, fluorine, chlorine, bromine or a cyano group, R_1 and R_2 are each loweralkyl radicals, R_3 is selected from the group consisting of hydroxyalkyl and substituted hydroxyalkyl radicals and (B) modified aminimides produced by reaction of the aminimides of (A) with reactants of the group consisting of organic isocyanates, epoxides, organic acids and anhydrides; with from about 0.01 to about 20% by weight, based on the weight of the composition, of an organic hydroperoxide.

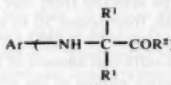
4,005,056

PROCESS FOR THE PREPARATION OF POLYHYDANTOINS AND POLYPARANIC ACIDS

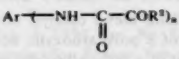
Willi Dunwald, Leverkusen; Jürgen Lewalter, Cologne, and Rudolf Merten, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Jan. 30, 1975, Ser. No. 545,380
Claims priority, application Germany, Feb. 1, 1974, 2404741
Int. Cl.² C08G 18/00
U.S. Cl. 260—77.5 CH 25 Claims

1. A process for the production of a foil, coating or other shaped product of a polyhydantoin or polyparabanic acid, wherein, in order to prepare the polyhydantoin, a bis- or polyglycine derivative of the formula



wherein Ar is an n-valent aromatic group; the groups R^1, which may be the same or different, are hydrogen, aryl or alkyl; R^2 is hydroxyl, amino, alkylamino, dialkylamino, alkoxy or aroxy and n is 2, 3 or 4, or, in order to prepare the polyparabanic acid, a bis- or polymonoamidooxalic acid of the formula



wherein Ar, R^2 and n are as aforesaid, is heated in the absence of a solvent with at least one blocked reaction product of a di- or poly(thio) isocyanate and a compound containing Zerewitinoff-active hydrogen atoms, to a temperature which obtains a highly fluid melt having a melt viscosity of at most 40,000 m.Pa.s without unblocking said blocked reaction product and the resulting melt is subjected to a shaping process and polycondensed at a temperature of from 150° to 400° C.

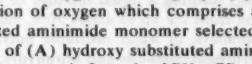
4,005,057

ANTISTATIC COMPOSITION CONTAINING AN N-ALKYL POLYCARBONAMIDE AND A PHOSPHONIUM SALT

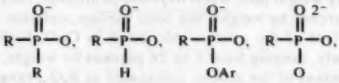
Gurdial Singh, Hockessin, Del., and Richard Edward von Rutte, Riehen-Basel, Switzerland, assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 403,334, Oct. 9, 1973, abandoned. This application Sept. 17, 1975, Ser. No. 614,230
Int. Cl.² C08G 69/46
U.S. Cl. 260—78 S 4 Claims

1. An antistatic composition having a log R_s of less than 8 and consisting essentially of an N-alkylpolycarbonamide having a Tg (NMR) of less than 25° C and from 0.02 to 35 weight percent based on the weight of the composition of a phosphonium salt of the formula



where $R_1R_2R_3$ and R_4 each represents a monovalent hydrocarbon group of from 1–18 carbon atoms; X^{a-} is an organic anion selected from the group of



and $R{+}SO_3^-)_m$

wherein Ar is an aromatic hydrocarbon radical; R is an aliphatic or an aromatic hydrocarbon radical; m is 1 or 2; and n, the valence of the anion, is 1 or 2.

4,005,058

PROCESS FOR THE FORMATION AND RECOVERY OF POLY(BISBENZIMIDAZOENZOPHENANTHROLINE)

Edward C. Chenevey, North Plainfield, and Harry T. Hanson, Millburn, both of N.J., assignors to Celanese Corporation, New York, N.Y.

Filed Feb. 5, 1976, Ser. No. 655,339
Int. Cl.² C08G 20/00, 20/32, 33/02, 20/20
U.S. Cl. 260—78.41 10 Claims

1. An improved process for the production and recovery of poly(bisbenzimidazobenzophenanthroline) comprising:

a. condensing substantially equimolar quantities of 1,4,5,8-tetracarboxy naphthalene dianhydride and 3,3',4,4'-tetraaminobiphenyl while dissolved in a reaction zone in molten antimony trichloride in a total concentration of about 3 to 10 percent by weight based upon the total weight of said reactants and said antimony trichloride while heating at a temperature of about 150 to 200° C. for about 2 to 10 hours,

b. discharging while at an elevated temperature the resulting reaction mass wherein said poly(bisbenzimidazobenzophenanthroline) is dissolved in antimony trichloride from said reaction zone into a precipitation zone containing hydrochloric acid having a hydrogen chloride content of about 10 to 20 percent by weight which is agitated and maintained at a temperature of about 50° to 100° C. wherein said poly(bisbenzimidazobenzophenanthroline) is precipitated in particulate form and said antimony trichloride is dissolved,

c. substantially separating said precipitated poly(bisbenzimidazobenzophenanthroline) particles from said hydrochloric acid and said antimony trichloride,

d. drying said poly(bisbenzimidazobenzophenanthroline) particles,

e. distilling said hydrochloric acid containing dissolved antimony trichloride resulting from step (c) to recover hydrochloric acid and antimony trichloride, and

f. recycling said antimony trichloride resulting from said distillation of step (e) to said reaction zone of step (a), and recycling said hydrochloric acid resulting from said distillation step (e) to said precipitation zone of step (b).

4,005,059

COPOLYMER OF N-VINYLCARBAZOLE

Adolphe Chapiro, Gif sur Yvette, and Zbigniew Mankowski, Paris, both of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly, France

Filed Apr. 30, 1974, Ser. No. 465,639

Claims priority, application France, May 3, 1973, 73.15931

Int. Cl.² C08F *220/06, 226/12*

U.S. Cl. 526—259 **3 Claims**

1. A copolymer made up of units of N-vinyl-carbazole alternated with units of a polymerisable ethylenically unsaturated carboxylic acid selected from acrylic acid and methacrylic acid

2. An at least semi-finished product composed of a copolymer as set forth in claim 1 cross-linked with at least one polyvalent metal ion.

4,005,060

METHOD, APPLIED IN THE PRODUCTION OF TALL OIL, OF PREVENTING OR REDUCING THE EMISSION OF ODOROUS SULPHUR COMPOUNDS AND/OR ACID SULPHUR COMBUSTION PRODUCTS FROM THE BLACK LIQUOR RECOVERY PROCESS IN ALKALINE PULPING

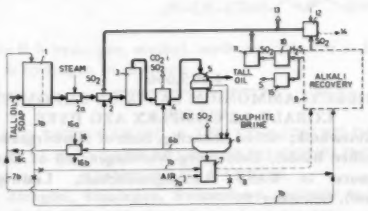
Nils Viktor Mannbro, Asarum, Sweden, assignor to Skogsagarnas Industri Aktiebolag, Vaxjo, Sweden

Filed Dec. 23, 1974, Ser. No. 535,343

Claims priority, application Sweden, Jan. 11, 1974, 7400366

Int. Cl.² C09F *1/00*

U.S. Cl. 260—97.7 **1 Claim**



1. In a method of reducing the emission of sulphur compounds from chemical regeneration processes for black liquor from alkaline wood pulping, in which crude soap is separated from the black liquor and subjected to acid soap splitting using sulphur dioxide and bisulphite, an acid reaction mixture being formed containing tall oil and sulphite brine and lignin sludge from which the tall oil is separated from the sulphite brine and the lignin sludge fraction, all the brine and lignin sludge being introduced into the chemical regeneration process for pulping liquor containing sulphide compounds; the improvement comprising preventing the emission of odorous and toxic sulphide-derived compounds from the soap-splitting by conducting said splitting in a single stage in which the soap is heated by steam injection to a temperature of about 110° C for a period of up to 1 hour in a closed soap-splitting vessel at super-atmospheric pressure while simultaneously injecting sulphur dioxide into said vessel to react with odorous and toxic compounds, reducing the contents of said vessel to atmospheric pressure whereby substantially only SO_2 and CO_2 are emitted from said brine.

4,005,061

METHOD FOR RECOVERING POTASSIUM HYDROXIDE AND ZINC OXIDE FROM POTASSIUM ZINCATE SOLUTIONS

Gilbert Lemaire, Douai, France, assignor to Saft-Societe des Accumulateurs Fixes et de Traction, Romainville, France and Compagnie Royale Asturienne des Mines, Brussels, Belgium

Continuation of Ser. No. 477,826, June 10, 1974, abandoned. This application Feb. 23, 1976, Ser. No. 660,724

Claims priority, application France, June 26, 1973, 73.23374

Int. Cl.² C01G *9/02;* **C01D** *1/32*

U.S. Cl. 423—102 **5 Claims**

1. Method of recovering decarbonated potassium hydroxide electrolyte for re-use in electrochemical cells and also zinc oxide from a waste potassium zincate solution extracted from a discharged electrochemical cell comprising the steps of agitating such extracted solution while adding 1 to 5 parts by volume of a solvent selected from the group consisting of methanol, ethanol, and mixtures thereof to said waste zincate solution to effect precipitation of said zinc oxide together with potassium carbonate therefrom, removing the precipitate and leaving a residual mother liquor comprising potassium hydroxide and said solvent and thereafter distilling said mother liquor to effect separation of decarbonated potassium hydroxide electrolyte from said mother liquid for direct re-use as electrolyte in electrochemical cells and recovering the distilled solvent for re-use with other waste potassium zincate solutions.

4,005,062

PROCESS OF PREPARING WATER-SOLUBLE WHIPPABLE EXTRACT FROM MICROORGANISM PROTEIN MATERIAL

Philip G. Schnell, Wheaton, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed Aug. 16, 1974, Ser. No. 497,844

Int. Cl.² A23J *1/18, 3/02*

U.S. Cl. 260—112 R **13 Claims**

1. A process for the isolation of a whippable protein fraction from microbial cells, consisting of the steps of:

a. providing an aqueous slurry containing from 1 to 20 wt. % (dry basis) microbial cells;

b. heating the slurry to a temperature within the range from about 30° to about 35° C.;

c. separating the heated slurry into a solid phase comprising residual cell material and a liquid supernatant phase comprising pigment and color ingredients;

d. reslurrying the residual cell material by adding water;

e. heating the reslurried residual cell material at temperatures of about 80° to 100° C. for a time period of about 45 to 75 minutes.

f. separating the heated slurry into a solid phase comprising residual cell material and an aqueous supernatant phase comprising a water-soluble protein fraction;

g. recovering the water-soluble protein fraction; and

h. drying the water-soluble protein fraction to produce a

product having light color, high foam expansion and stability, bland taste and heat stability.

4,005,063

[DES-GLY]^{10}-GNRH NONAPEPTIDE ANIDE ANALOGS IN POSITION 6 HAVING OVULATION-INDUCING ACTIVITY

Ronald Lee Gendrich, Waukegan; Riemond Henry Rippel, Gurnee, and John Hunter Seely, Lake Bluff, all of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Division of Ser. No. 405,334, Oct. 11, 1973, Pat. No. 3,914,412. This application May 15, 1975, Ser. No. 577,815

Int. Cl.^{2} C07C *103/52;* **C08H** *1/00*

U.S. Cl. 260—112.5 LH **1 Claim**

1. A nonapeptide of the formula:

pGlu—His—Trp—Ser—Tyr—X—Leu—Arg—Pro—NHC_2H_5

wherein all aminoacids are present in their optical L-configuration and wherein X represents leucyl in the D-configuration.

4,005,064

LIQUID CRYSTAL OR MESOMORPHIC 4-METHOXYALKOXY-4'-ALKYL AZOXYBENZENE COMPOUNDS

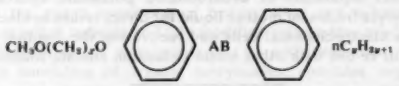
Heinz J. Dietrich, and Edward L. Steiger, both of Toledo, Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed May 18, 1971, Ser. No. 144,669

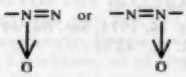
Int. Cl.^{2} C07C *105/00*

U.S. Cl. 260—143 **2 Claims**

1. As a composition of matter, a compound having the chemical structure



where *x* and *y* are the same or different integers of 1 to 10 and where AB is selected from



said compound exhibiting liquid-crystal properties.

4,005,065

UNSYMMETRICAL PHENYL AZO NAPHTHYL CHROMIUM COMPLEX DYES

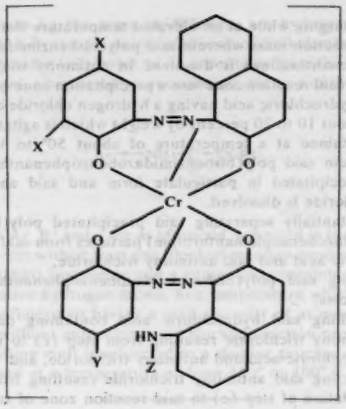
Fabio Beffa, Riehen, Switzerland, and Gerhard Back, Lorrach, Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed June 17, 1974, Ser. No. 479,918

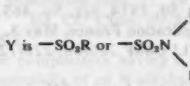
Int. Cl.^{2} C09B *45/06, 45/16;* **D06P** *1/10, 3/02*

U.S. Cl. 260—145 A **4 Claims**

1. A chromium complex dye, which, in the form of its free acid, has the formula



wherein one X is sulfo and the other X is nitro,



where R is lower alkyl; lower alkyl substituted by chloro or phenyl; cyclohexyl; phenyl or phenyl substituted by chloro, bromo, nitro, methyl or methoxy,

R_1 and R_2 independently represent hydrogen, lower alkyl or lower alkyl substituted by hydroxy, cyano, lower alkoxy, phenyl, chloro or bromo; and

R_2 additionally represents cyclohexyl, phenyl or phenyl, substituted by fluoro, chloro, bromo, lower alkyl or lower alkoxy; and

Z is lower alkanoyl, lower alkoxycarbonyl, lower alkylsulfonyl, or is arylcarbonyl, aryloxycarbonyl or arylsulfonyl wherein "aryl" is phenyl or phenyl substituted by chloro, bromo, nitro, lower alkyl or lower alkoxy.

4,005,066

ISOTRIDECYLAMMONIUM SALTS OF CHROMIUM OR COBALT 1:2 COMPLEX AZO DYES

Peter Gottschalk; Alfred Schoellig, both of Limburgerhof, and Guenther Riedel, Heidelberg-Wieblingen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed June 26, 1974, Ser. No. 483,241

Claims priority, application Germany, July 5, 1973, 2334228

Int. Cl.^{2} C09B *43/00*

U.S. Cl. 260—145 A **6 Claims**

1. An isotridecylammonium salt of a chromium or cobalt 1:2 complex azo dye.

4,005,067

PROCESS FOR THE SYNTHESIS OF NITRITE ION-CONTAINING 1:1 COMPLEXES OF COBALT AND METALLIZABLE MONOAZO OR AZOMETHINE COMPOUNDS AND SUCH COMPLEXES

Jacky Dore, Basel, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

Continuation-in-part of Ser. Nos. 189,767, Oct. 15, 1971, abandoned, and Ser. No. 533,521, Dec. 17, 1974, which is a continuation-in-part of Ser. No. 189,768, Oct. 15, 1971, abandoned. This application June 2, 1975, Ser. No. 583,335

Claims priority, application Switzerland, Oct. 28, 1970, 15925/70; June 11, 1971, 8519/71; June 23, 1971, 9173/71

Int. Cl.[2] C07C *119/00, 131/00;* **C09B** *45/10, 45/20*

U.S. Cl. 260—151 **27 Claims**

1. A process for the synthesis of a 1:1 complex of cobalt and an azo or azomethine dye having metallizable substituents in ortho and ortho′ positions relative to an azo or azomethine group, said complex containing a nitrite ion bound to the cobalt atom, which process comprises reacting at a pH of 3 to 7 an azo or azomethine dye having said metallizable substituents with cobalt ion and nitrite ion, said cobalt ion and nitrite ion being present in amounts sufficient to produce a 1:1 complex of cobalt and said dye containing a nitrite ion bound to the cobalt atom, whereby such a complex is produced.

21. A 1:1 complex of cobalt and an azo or azomethine dye having metallizable substituents in ortho and ortho′ positions relative to one azo or azomethine group, said complex containing a nitrite ion bound to the cobalt atom, produced according to the process of claim **1.**

4,005,068

DISAZO COMPOUNDS FROM DIPHENYLENE SULFONES AND ACETOACETYLBENZIMIDAZOLONES

Klaus Hunger, Kelkheim, Taunus, and Bernhard Mees, Konigstein, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed June 4, 1974, Ser. No. 476,267

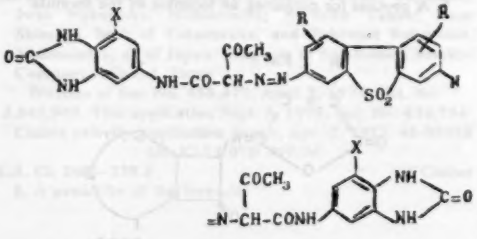
Claims priority, application Germany, June 6, 1973, 2328678

Disclosure was also published under second Trial Voluntary Protest Program on Apr. 6, 1976

Int. Cl.[2] C09B *35/34;* **D06P** *3/00, 3/24, 3/52*

U.S. Cl. 260—157 **3 Claims**

1. A disazo pigment of the formula



wherein R is hydrogen, methyl, methoxy, chlorine or bromine and X is hydrogen or chlorine.

4,005,069

AZO DYES HAVING A 3-HALO-4-CYANO OR ACYL-6-HYDROXYPYRIDONE-2 COUPLING COMPONENT RADICAL

Ulrich Zirngibl, Binningen, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

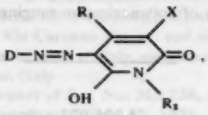
Continuation of Ser. No. 253,410, May 15, 1972, abandoned. This application Feb. 18, 1975, Ser. No. 550,512

Claims priority, application Switzerland, May 18, 1971, 7276/71

Int. Cl.[2] C09B *29/36, 43/00*

U.S. Cl. 260—156 **26 Claims**

1. A compound of the formula



wherein

D is phenyl, naphthyl, pyridyl, thienyl, thiazolyl, benzothiazolyl, benzoisothiazolyl, thiadiazolyl, imidazolyl, triazolyl, quinolyl or isoquinolyl, or a substituted derivative thereof,

wherein each substituent of each substituted derivative is independently halo, hydroxy, cyano, thiocyano, nitro, acyl, acyloxy, acylamino, alkyl, alkoxy, phenyl, phenoxy, phenoxy substituted by chlorine or bromine, phenoxysulfonyl, alkylmercapto, phenylmercapto or phenylazo,

R_1 is cyano, $-COOR_3$ or $-CONR_4R_5$,

wherein R_3 is alkyl or phenyl,

R_4 is hydrogen, alkyl, alkoxyalkyl, phenyl, amino, alkylamino, dialkylamino, phenylamino, N-alkyl-N-phenylamino, morpholino, piperidino or sulfolyl, and

R_5 is hydrogen, alkyl or phenyl,

R_2 is hydrogen, alkyl, alkyl substituted by alkoxy, hydroxy, cyano, alkylcarbonylamino, phenyl or alkoxycarbonyl, phenyl, amino, alkylamino, dialkylamino, phenylamino, N-alkyl-N-phenylamino, morpholino, piperidino or sulfolyl, and

X is chloro or bromo,

wherein each acyl and acyl radical of each acyloxy and acylamino is independently R—Y— or R′—Z—,

wherein

R is alkyl or phenyl,

Y is —OCO— or $—SO_2—$,

R′ is hydrogen, alkyl or phenyl, and

Z is —CO—, —NR′—CO— or —NR′SO_2—, and each alkyl, alkoxy, alkyl moiety and alkoxy moiety independently has 1 to 6 carbon atoms.

4,005,070

POLYMER DERIVATIVE OF -DIETHYLAMINOETHYL ESTER OF P-AMINOBENZOIC ACID WITH CELLULOSEGLYCOLIC ACID, METHOD OF PRODUCING AND APPLICATION THEREOF

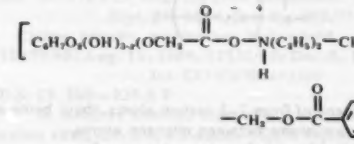
Milda Jaovna Pormale, ulitsa Suvorova, 104, kv. 10; Nadezhda Alexandrovna Kashkina, ulitsa Talsu, 9/11, kv. 22; Arvid Janovich Kalninsh, ulitsa Sverdlova, 8, kv. 3; Varvara Nikolaevna Sergeeva, bulvar Rainisa, 11, kv. 2; Janis Alexandrovich Surna, ulitsa M.Kaiju, 3, kv. 3; Janis Shusters, ulitsa Kveles, 15, korpus 4, kv. 30; Modris Jaowich Melzobs, ulitsa Veidenbauma, 1/3, kv. 3a; Waldis Danielowich Mikazhan, ulitsa Marupes, 17, kv. 32; Indulis Waldowich Purwinsh, ulitsa Marupes, 17, kv. 35; Antons Petrowich Skutelis, ulitsa Marupes, 17, kv. 32, and Martinsh Aleksandrowich Liepinsh, ulitsa dzirtsiema, 91, kv. 40, all of Riga, U.S.S.R.

Filed Nov. 30, 1971, Ser. No. 203,470

Int. Cl.[2] A61K *31/245;* **C08B** *13/00*

U.S. Cl. 536—66 **4 Claims**

1. The salt of β-diethylaminoethyl p-aminobenzoate with celluloseglycolic acid having the following general formula:



where:

x is the degree of substitution ranging from 75 to 100
n is the degree of polymerization ranging from 30 to 120.

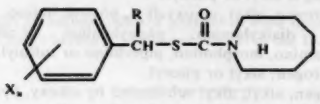
4,005,071

P-CHLOROBENZYL N,N-HEXAMETHYLENETHIOLCARBAMATE

Masahiro Aya; Masao Miyamoto; Nobuo Fukazawa, and Masaaki Yamagishi, all of Tokyo, Japan, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation of Ser. No. 114,031, Feb. 9, 1971. This application Apr. 16, 1975, Ser. No. 568,750
Claims priority, application Japan, Feb. 14, 1970, 45-12463
Int. Cl.² C07D *295/20*
U.S. Cl. 260—239 BF **1 Claim**

1. Thiolcarbamic acid ester compound of the formula



wherein R is hydrogen, n is 1, X is chloro and the substituted position is para.

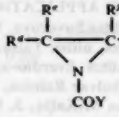
4,005,072

OIL-SOLUBLE AZIRIDINYL UREA COMPOUNDS AS LUBRICATING OIL DETERGENTS

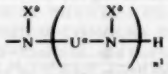
Louis De Vries, Greenbrae, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation of Ser. No. 5,129, Jan. 22, 1970, abandoned. This application Apr. 25, 1975, Ser. No. 571,885
Int. Cl.² C07D *203/20*
U.S. Cl. 260—239 E **4 Claims**

1. A compound of the formula



wherein
R^{d-f} are the same or different and are hydrogen or lower alkyl;
R^g is a branched chain aliphatic hydrocarbon group free of unsaturation containing 30–200 carbon atoms and having at least 1 branch of from 1 to 2 carbon atoms per 4 carbon atoms along the chain; and
Y is a monovalent radical of the formula



wherein
U^e is an alkylene of from 2–3 carbon atoms, there being at least 2 carbon atoms between nitrogen atoms,
X^h is an alkyl of from 1–2 carbon atoms, and
n^1 is an integer of from 2–4.

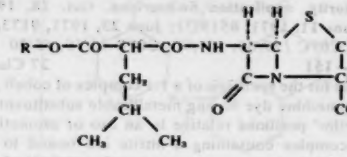
4,005,073

6-ACYL DERIVATIVES OF AMINOPENICILLANIC ACID

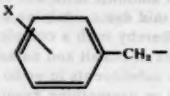
Roland Reiner, Basel, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Feb. 24, 1975, Ser. No. 552,485
Claims priority, application Switzerland, Mar. 12, 1974, 3415/74
Int. Cl.² C07D *499/66*
U.S. Cl. 260—239.1 **4 Claims**

1. Compounds represented by the formula



wherein R is represented by the formula



wherein X is hydrogen, halogen, hydroxy, lower alkyl, lower alkoxy or lower alkoxy-lower alkyl
and pharmaceutically acceptable salts and hydrated forms thereof.

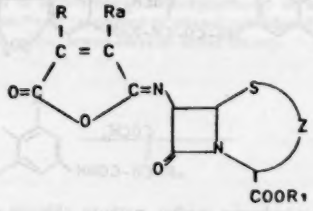
4,005,074

PROCESS FOR CLEAVING AN IMIDO SIDE CHAIN FROM PENICILLINS AND CEPHALOSPORINS

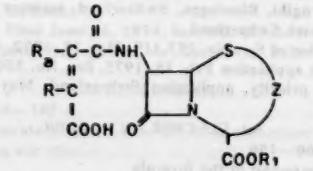
Stjepan P. Kukolja, Indianapolis, and Steven R. Lammert, Greenwood, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed June 18, 1973, Ser. No. 371,095
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976
Int. Cl.² C07D *501/20*
U.S. Cl. 260—239.1 **59 Claims**

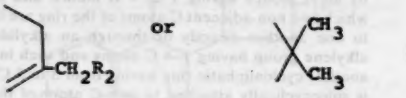
1. A process for preparing an isoimide of the formula



which comprises the step of dehydrating an amic acid of the formula

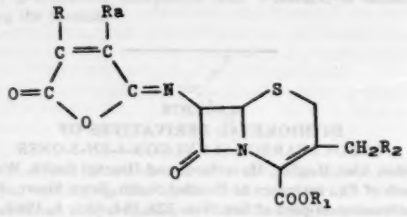


in which, in the above formulae, R and R_a are hydrogen, or R and R_a taken together with the carbon atoms to which they are attached represent an ortho-phenylene ring;



R_1 is hydrogen or a carboxy protecting group; and R_2 is hydrogen, acetoxy, methoxy, methylthio, (5-methyl-1,3,4-thiadiazol-2-yl)thio, or (1-methyl-1H-tetrazol-5-yl)thio.

46. A compound of the formula



in which R and R_a are hydrogen, or R and R_a taken together with the carbon atoms to which they are attached represent an orthophenylene ring; R_1 is hydrogen or a carboxy protecting group; and R_2 is hydrogen, acetoxy, methoxy, methylthio, (5-methyl-1,3,4-thiadiazol-2-yl)thio, or (1-methyl-1H-tetrazol-5-yl)thio.

4,005,075

PENICILLINS AND THEIR PREPARATION

Hirotada Yamada, Nishinomiya; Hisao Tobiki, Toyonaka; Iwao Nakatsuka, Nishinomiya; Norihiko Tanno; Kozo Shimago, both of Takarazuka, and Takenari Nakagome, Nishinomiya, all of Japan, assignors to Sumitomo Chemical Company, Limited, Japan

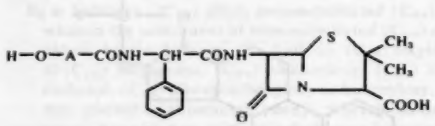
Division of Ser. No. 458,417, April 5, 1974, Pat. No. 3,945,995. This application Sept. 5, 1975, Ser. No. 610,754

Claims priority, application Japan, Apr. 5, 1973, 48-39358

Int. Cl.² C07D *499/68*

U.S. Cl. 260—239.1 **4 Claims**

1. A penicillin of the formula:



wherein A represents a heterocyclic aromatic ring selected from the group consisting of pyridine, pyrimidine, pyridazine, triazine, pyrazine, quinoline, isoquinoline, cinnoline, naphthyridine, quinoxaline, pyrazolopyridine, thiazolopyrimidine and pyridopyrimidine.

4,005,076

HYDRAZONES OF 3-FORMYLRIFAMYCIN SV

Renato Cricchio, Via Carcano Varese, and Giancarlo Lancini, Via Vittadini Pavia, both of Italy, assignors to Gruppo Lepetit S.p.A., Milan, Italy

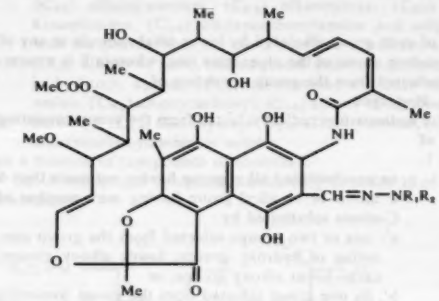
Continuation-in-part of Ser. No. 263,238, June 15, 1972, abandoned. This application Dec. 30, 1974, Ser. No. 537,306

Claims priority, application Italy, June 24, 1971, 89608/71

Int. Cl.² C07D *498/08*

U.S. Cl. 260—239.3 P **11 Claims**

1. A compound of the formula



wherein

R_1 is selected from hydrogen, 1 to 12 carbon alkyl, phenyl and benzyl; R_2 is selected from 5 to 12 carbon alkyl; 3 to 5 carbon alkenyl; phenyl; phenyl substituted with one to three groups each independently selected from lower alkyl, halo, nitro, lower alkoxy, trifluoromethyl, amino, sulfo, fluorosulfonyl, lower alkylsulfonyl and fluoro-lower alkylsulfonyl; phenoxy-lower alkyl wherein the lower alkyl moiety has 2 to 4 carbons and the phenoxy group may have one to three substituents each independently selected from halo, amino, and acetamino; 5 to 15 carbon cycloalkyl; 4-biphenyl; 4-phenylbenzyl; heterocyclic ring selected from pyridine, pyridine substituted with 1 to 2 groups each independently selected from lower alkyl and nitro, N-lower alkyl-substituted piperidine, pyrimidine, pyrimidine substituted with 1 to 2 groups, each independently selected from lower alkyl, hydroxy and nitro, pyridazine, pyridazine substituted with 1 to 2 groups each independently selected from amino, chloro, phenoxy, piperidino, N-lower alkyl-piperazino and bis(hydroxyethyl-)amino, quinoline, quinoline substituted with 1 to 2 groups each independently selected from lower alkyl, lower alkoxy, fluoro, trifluoromethyl and phenyl; with the proviso that when R_1 is hydrogen or 1 to 4 carbon alkyl, R_2 is not phenyl; and their 16, 17; 18, 19; 28, 29-hexahydro and 27-demethoxy-27-hydroxy analogous compounds.

4,005,077

ANTIBIOTICALLY ACTIVE COMPOUNDS

Hans Bickel, Binningen, and Wilhelm Kump, Biel-Benken, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 342,222, March 16, 1973, abandoned, which is a continuation-in-part of Ser. No. 5,899, Jan. 26, 1970, abandoned, which is a continuation-in-part of Ser. No. 571,413, Aug. 10, 1966, abandoned. This application Sept. 25, 1974, Ser. No. 508,974

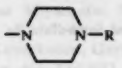
Claims priority, application Switzerland, Aug. 24, 1965, 11879/65; Aug. 11, 1969, 12131/69; Dec. 8, 1969, 18249/69

Int. Cl.² C07D *491/06*

U.S. Cl. 260—239.3 P **10 Claims**

1. A member selected from the group consisting of a 3-amino rifamycin SV, a 3-amino-16,17; 18,19-tetrahydro-rifamycin SV, a 3-amino-16,17; 18,19; 28,29-hexahydro-rifamycin SV, the corresponding quinonic forms of these compounds

derived from rifamycin S, alkali metal salts of the hydroquinonic form of these compounds, therapeutically acceptable acid addition salts, and quarternary ammonium salts with hydrohalic, sulphuric or sulphonic acid esters of alkanols having from 1 to 16 C atoms, of these compounds, wherein the 3-amino group is a member selected from the group consisting of a 1-piperazinyl group of the formula



and of such group alkylated by lower alkyl radicals at any of the carbon atoms of the piperazine ring, wherein R is a member selected from the group consisting of

A. Hydrogen

B. a hydrocarbon radical selected from the group consisting of

1.

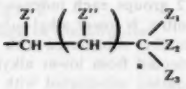
a. an unsubstituted alkyl group having not more than 6 C atoms or an alkyl group having such number of C-atoms substituted by

a'. one or two groups selected from the group consisting of hydroxy groups, lower alkoxy groups, carbo-lower alkoxy groups, or

b'. by one group selected from the group consisting of phenyl and phenyl substituted by one or two identical or different radicals selected from the group consisting of lower alkyl, lower alkoxy and halogen atoms

b. phenyl and phenyl substituted by one or two identical or different radicals selected from the group consisting of lower alkyl, lower alkoxy and halogen atoms, the terms "lower" as referred to alkyl, alkoxy and carbo-lower alkoxy groups having the meaning "from 1 to 6 C-atoms",

2. a hydrocarbon radical with not more than 35 C atoms of the formula



(III)

in which

n=0 or 1, and

Z_1 represents, when taken alone,

a. an unsubstituted lower alkyl or lower alkenyl group

b. a lower alkyl or lower alkenyl group substituted by

a'. phenyl or phenyl substituted by 1 to 3 lower alkyl groups or halogen atoms or

b'. C_3–C_8 cycloalkyl or C_3–C_8 cycloalkenyl

c. phenyl or phenyl substituted by 1 to 3 lower alkyl groups or halogen atoms

d. C_3–C_8 cycloalkyl or C_3–C_8 cycloalkenyl

Z_2 represents, when taken alone, hydrogen, or a lower alkyl or lower alkenyl group,

Z_3 represents, when taken alone, a lower alkyl or lower alkenyl group,

Z' and Z'', when taken alone, each represent hydrogen or an alkyl group of 1–4 carbon atoms,

Z_3 taken together with Z'' represents a double bond,

Z_2 taken together with Z_3 represents a lower alkylidene or lower alkenylidene group,

Z_1 taken together with Z_3 represents an unsubstituted lower alkylene or lower alkenylene group,

Z_1 taken together with Z_2 represents an lower alkylene or lower alkenylene group in the case that Z_3 taken together with Z'' represents a double bond,

with the proviso that the cycloaliphatic groups mentioned, or those formed by an alkylene or alkenylene group $Z_1 + Z_3$ or $Z_1 + Z_2$ together with the C atom indicated in formula (III) to which Z_1, Z_2 and Z_3 are bonded, include such having unsubstituted cycloaliphatic rings as well as such whose rings are substituted by alkyl groups having 1 to 4 C atoms, and such in which two non-adjacent C atoms of the ring are bonded to one another directly or through an alkylidene or alkylene group having 1–4 C atoms and such in which another cycloaliphatic ring having from 3 to 5 C atoms is spirocyclically attached to one C atom of the ring, with the proviso that all such cycloaliphatic groups have not more than a total of 12 carbon atoms and from 3 to 8 ring carbon atoms, any lower alkyl, alkenyl, alkylidene or alkenylidene group containing from 1 to 7 carbon atoms,

3. the allyl group.

4,005,078

DITHIOKETAL DERIVATIVES OF 13-POLYCARBONALKYLGON-4-EN-3-ONES

Gordon Alan Hughes, Haverford, and Herchel Smith, Wayne, both of Pa., assignors to Herchel Smith, Bryn Mawr, Pa.

Continuation-in-part of Ser. Nos. 228,384, Oct. 4, 1962, Pat. No. 3,850,911, Ser. No. 337,823, Jan. 15, 1964, and Ser. No. 388,820, Aug. 11, 1964. This application June 29, 1966, Ser. No. 561,365

Disclosure was also published under second Trial Voluntary Protest Program on Apr. 13, 1976

Int. Cl.² C07J *33/00*

U.S. Cl. 260—239.5 **5 Claims**

1. The composition of matter selected from the group consisting of 17-ethynyl-17β-hydroxy-gon-4-en-3-thioketal having an alkyl group containing 2 to 4 carbons at the 13-position, 17-chloroethynyl-17β-hydroxy-gon-4-en-3-thioketal having an alkyl group containing 2 to 4 carbons at the 13-position, and the acetate esters thereof.

4,005,079

TETRAHYDROPYRANYL ETHERS OF ESTROGENS

Pietro De Ruggieri, and Orazio Sighinolfi, both of Milan, Italy, assignors to Farmila Farmaceutici Milano S.p.A., Italy

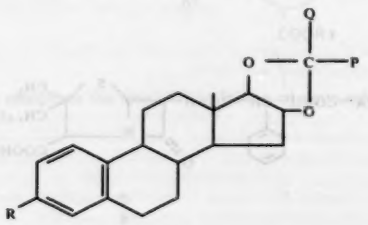
Filed Nov. 19, 1975, Ser. No. 633,476

Claims priority, application Italy, Dec. 13, 1974, 30574/74

Int. Cl.² C07J *21/00*

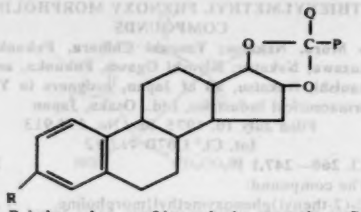
U.S. Cl. 260—239.55 D **5 Claims**

1. Compound of the formula



in which R is benzyloxy or 2'-tetrahydropyranyloxy; P is hydrogen, lower alkyl, monocyclic cycloalkyl or monocyclic aryl; Q is lower alkyl, monocyclic cycloalkyl or monocyclic aryl;

2. Process for preparing a compound of the formula



in which R is benzyloxy or 2'-tetrahydropyranyloxy; P is hydrogen, lower alkyl, monocyclic cycloalkyl or monocyclic aryl; Q is lower alkyl, monocyclic cycloalkyl or monocyclic aryl; which comprises reacting a corresponding 3-benzyloxy-16β,17β-dihydroxy compound with a ketone or aldehyde having the formula

wherein P and Q are as above in the presence of an acid catalyst; subjecting the cyclic 3-benzyloxy-16β,17β-acetal thus obtained to hydrogenalysis of the benzyl group and finally etherifying the phenolic function thus liberated with 2,3-dihydropyran in the presence of an acid catalyst.

4,005,080

SUBSTITUTED 2-IMIDAZOLIN-5-ONES

Werner Koch, Oberwil, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

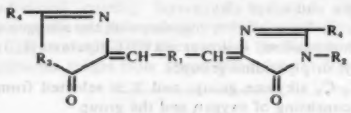
Continuation-in-part of Ser. No. 525,759, Nov. 21, 1974, abandoned. This application Nov. 26, 1974, Ser. No. 527,472

Claims priority, application Switzerland, Nov. 28, 1973, 16697/73; Aug. 16, 1974, 11255/74

Int. Cl.² C07D *403/10, 413/10*

U.S. Cl. 260—240 F **38 Claims**

1. A compound of formula I,



wherein

R_1 is 1,4-phenylene, naphthylene, substituted 1,4-phenylene or substituted naphthylene, wherein substituted 1,4-phenylene or substituted naphthylene has one or two substituents independently selected from chloro, bromo, hydroxy, methyl, methoxy, ethoxy, trifluoromethyl, (C_{2-4}) alkanoylamino, benzoylamino and nitro, with the proviso that not more than one substituent is trifluoromethyl, (C_{2-4}) alkanoylamino, benzoylamino or nitro,

R_2 is hydrogen, (C_{1-4}) alkyl, monosubstituted (C_{1-4}) alkyl, wherein the substituent of monosubstituted (C_{1-4}) alkyl is chloro, bromo, hydroxy, (C_{1-4}) alkoxy, (C_{1-4}) alkylamino, di-(C_{1-4}) alkylamino, (C_{2-4}) alkanoyloxy, (C_{1-4}) alkoxycarbonyl, (C_{1-4}) alkoxycarbonyloxy or benzoyloxy, naphthyl, phenyl or substituted phenyl, wherein substituted phenyl has one, two or three substituents independently selected from chloro, bromo, methyl, (C_{1-4}) alkoxy, (C_{1-4}) alkoxycarbonyl, cyano, nitro, hydroxy, (C_{1-4}) alkylamino, di-(C_{1-4}) alkylamino, (C_{2-4}) alkanoylamino and (C_{1-4}) alkoxycarbonylamino, with the proviso that not more than two substituents are (C_{1-4}) alkoxy, (C_{1-4}) alkoxycarbonyl, cyano or nitro, and not more than one substituent is hydroxy, (C_{1-4}) alkylamino, di-(C_{1-4}) alkylamino, (C_{2-4}) alkanoylamino or (C_{1-4}) alkoxycarbonylamino,

R_3 is oxygen or a group of the formula

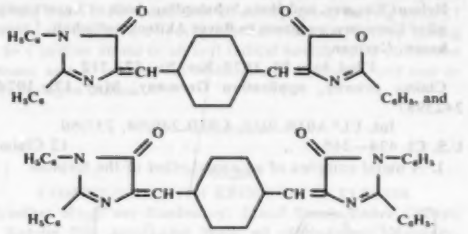
wherein R_5 has one of the significances given above for R_2, and

each of the

R_4's is, independently, phenyl, naphthyl, substituted phenyl or substituted naphthyl, wherein substituted phenyl or substituted naphthyl has one, two or three substituents independently selected from chloro, bromo, methyl, (C_{1-4}) alkoxy, nitro, hydroxy, cyano, (C_{1-4}) alkylamino, di-(C_{1-4}) alkylamino, (C_{1-4}) alkoxycarbonyl, (C_{1-4}) alkoxy (C_{1-4}) alkoxy-caronyl, (C_{2-4}) alkanoyloxy, (C_{2-4}) alkanoylamino, (C_{1-4}) alkoxycarbonylamino and sulpho, with the proviso that not more than two substituents are (C_{1-4}) alkoxy or nitro, and not more than one substituent is hydroxy, cyano, (C_{1-4}) alkylamino, di-(C_{1-4}) alkylamino, (C_{1-4}) alkoxycarbonyl,)C_{1-4}) alkoxy (C_{1-4}) alkoxycarbonyl, (C_{2-4}) alkanoyloxy, (C_{2-4}) alkanoylamino, (C_{1-4}) alkoxycarbonylamino or sulpho,

or a mixture of compounds of formula I.

33. A mixture of compounds according to claim 1, of the formulae



4,005,081

3-HETEROTHIOMETHYL-7α-METHOXY-7β-TETRAZOLYLMETHYLTHIOACETAMIDO-3-CEPHEM DERIVATIVES

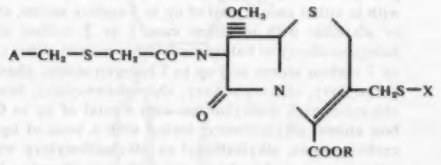
Tetsuo Miyadera, Kanagawa, Japan; Hermann Breuer, and Uwe D. Treuner, both of Regensburg, Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Sept. 11, 1975, Ser. No. 612,387

Int. Cl.² C07D *501/56*

U.S. Cl. 260—243 C **8 Claims**

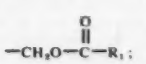
1. A compound of the formula



wherein

A is a tetrazole ring attached by a nitrogen atom, unsubstituted or substituted by lower alkyl;

R is hydrogen, lower alkyl, phenyl-lower alkyl, diphenyl-lower alkyl, alkali metal, alkaline earth metal, lower alkylamine, tri (lower alkyl) amine, (C_5-C_6-cyclo-lower alkyl)amine or



R_1 is lower alkyl, phenyl or phenyl-lower alkyl; and

X is one of the heterocyclic rings oxadiazoloyl, thiadiazolyl, thiatriazolyl, triazolyl or tetrazolyl, unsubstituted or substituted with lower alkyl;

said lower alkyl groups having up to seven carbon atoms.

4,005,082

1H-2,3-BENZOXAZINES

Giorgio Pifferi, Milan, Italy, assignor to Gruppo Lepetit S.p.A., Milan, Italy

Continuation-in-part of Ser. No. 761,835, Sept. 23, 1968, abandoned. This application Mar. 19, 1971, Ser. No. 126,357

Claims priority, application United Kingdom, Sept. 25, 1967, 43621/67

Int. Cl.² C07D *265/20*

U.S. Cl. 260—244 R **2 Claims**

1. 6-Chloro-4-(isopropylidene-hydrazino)-1H-2.3-benzoxazine.

4,005,083

METAL COMPLEXES OF AZOLYL ETHERS

Karl Heinz Büchel; Wolfgang Kramer, both of Wuppertal; Helmut Kaspers, and Hans Scheinpflug, both of Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

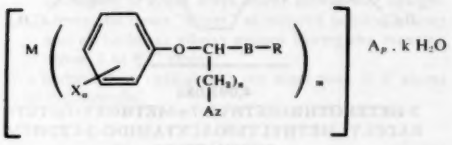
Filed Apr. 30, 1975, Ser. No. 573,212

Claims priority, application Germany, May 17, 1974, 2423987

Int. Cl.² A01N *9/22*; **C07D** *249/08, 233/60*

U.S. Cl. 424—245 **12 Claims**

1. A metal complex of an azolyl ether of the formula



in which

M is copper, zinc, manganese, magnesium, tin iron or nickel,

X is halogen, nitro, nitrile, amino, alkyl or cycloalkyl with in either case up to 6 carbon atoms, halogenoalkyl with 1 or 2 carbon atoms and up to 5 halogen atoms, hydroxymethyl, phenyl, halogenophenyl, phenyl-substituted phenyl, carboxyl, alkoxycarbonyl or alkylcarbonyloxy with in either case a total of up to 5 carbon atoms, alkoxy or alkylthio with in either case 1 or 2 carbon atoms, halogenoalkoxy or halogenoalkylthio with in either case 1 or 2 carbon atoms and up to 5 halogen atoms, phenoxy, benzoyloxy, chlorophenoxy, chlorobenzoyloxy, benzoyl, chlorobenzoyl, dialkylamino with a total of up to 6 carbon atoms, alkylcarbonyl amino with a total of up to 4 carbon atoms, alkylsulfonyl or alkylsulfonyloxy with in either case 1 or 2 carbon atoms, phenylsulfonyl and phenylsulfonyloxy,

Az is an imidazolyl radical, a 1,2,4-triazolyl-(1) radical or a 1,2,4-triazolyl-(4) radical,

B is CO or CH(OH),

R is alkyl with up to 6 carbon atoms or optionally phenyl substituted in o- or p-position with halogen, nitro, nitrile or methyl,

A is a chloride, bromide, iodide, nitrate, sulfate or phosphate anion,

a is 0 or an integer from 1 to 4,

n is 0 or 1,

m is an integer from 1 to 4,

p is an integer from 1 to 4, and

k is an integer from 0 to 8.

4,005,084

THIENYLMETHYL PHENOXY MORPHOLINE COMPOUNDS

Tomio Muro, Nakatsu; Yasuaki Chihara, Fukuoka; Sogo Fukuzawa, Nakatsu; Kiyoshi Ogawa, Fukuoka, and Akira Nakanishi, Nakatsu, all of Japan, assignors to Yoshitomi Pharmaceutical Industries, Ltd., Osaka, Japan

Filed July 10, 1975, Ser. No. 594,913

Int. Cl.² C07D *413/12*

U.S. Cl. 260—247.1 P **5 Claims**

1. The compound:
2-[2-(2-thenyl)phenoxymethyl]morpholine.

4,005,085

BENZOPHENONE DERIVATIVES

Joseph Hellerbach, and André Szente, both of Basel, Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

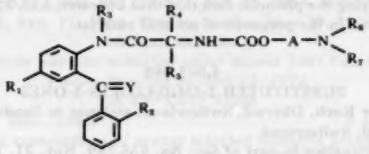
Filed Nov. 22, 1974, Ser. No. 522,678

Claims priority, application Switzerland, Nov. 15, 1973, 16101/73

Int. Cl.² C07D *95/00*

U.S. Cl. 260—247.2 B **6 Claims**

1. A compound of the formula



wherein

R_1 is selected from the group consisting of hydrogen, nitro, halogen and trifluoromethyl;

R_2 is selected from the group consisting of hydrogen and halogen;

R_3, R_4 and R_5 are selected from the group consisting of hydrogen and lower alkyl;

R_6 and R_7 are lower alkyl or together with the nitrogen atom are a morpholino, 4-(lower alkyl)-1-piperazinyl, 1-pyrrolidinyl or piperidino group;

A is a C_2–C_6 alkylene group; and Y is selected from the group consisting of oxygen and the group

wherein

R_8 and R_9 are lower alkyl or together are lower alkylene; and the pharmaceutically acceptable acid addition salts thereof.

4,005,086

HYDROXYCITRIC ACID DERIVATIVES

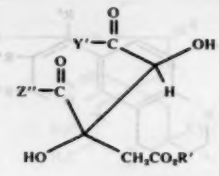
Robert William Guthrie, Fairfield, and Richard Wightman Kierstead, North Caldwell, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 376,478, July 5, 1973, Pat. No. 3,919,254, which is a division of Ser. No. 204,288, Dec. 2, 1971, Pat. No. 3,767,678. This application Aug. 1, 1975, Ser. No. 601,065

Int. Cl.² C07D *295/18, 401/08, 403/06, 413/06*

U.S. Cl. 260—247.2 A **1 Claim**

1. A compound of the formula



where R′ is lower alkyl, aryl lower alkyl, wherein aryl is selected from the group consisting of phenyl or phenyl monosubstituted with chlorine, bromine, iodine, fluorine, lower alkyl, hydroxy, lower alkoxy, nitro, cyano, carboxy or lower alkanoyl-amino or aryl, wherein aryl is as defined above; Y′ is one of the groups OR_3' or NR_5R_6; Z″ is one of the groups OR_3'' or NR_5R_6, wherein R_3' and R_3'' are lower alkyl, aryl lower alkyl, wherein aryl is as defined above or aryl, wherein aryl is as defined above; R_3, R_4, R_5 and R_6 each taken independently is hydrogen, lower alkyl, monocyclic or polycyclic cycloalkyl having 3 to 8 carbon atoms in each ring, aryl, wherein aryl is as defined above or aryl lower alkyl, wherein aryl is as defined above; R_3 and R_4 taken together with the adjacent nitrogen atom and R_5 and R_6 taken together with the adjacent nitrogen atom each independently form a 5- or 6-membered heterocyclic ring selected from the group consisting of morpholino, piperidino and pyrrolidino; but with the added proviso that Y′ cannot be OR_3' when Z″ is OR_3''.

4,005,087

SPRAY GRAINING TECHNIQUE FOR PREPARING GRANULAR HYDRATED ALKALI METAL DIHALOISOCYANURATE

Walter C. Saeman, Cleveland, Tenn., assignor to Olin Corporation, New Haven, Conn.

Filed Sept. 29, 1975, Ser. No. 617,879

Int. Cl.² C07D 251/36

U.S. Cl. 260—248 C **26 Claims**

1. Granular particles of alkali metal dihaloisocyanurate each having a smooth rounded surface comprised of a core of alkali metal dihaloisocyanurate encapsulated with a plurality of individual coating layers of hydrated alkali metal dihaloisocyanurate, wherein said core ranges in diameter from about 200 to about 2000 microns and the outside diameter of said particles ranges from about 400 to about 5000 microns.

4,005,088

PROCESS FOR THE CHEMICAL SEPARATION OF RACEMIC MODIFICATIONS OF α-AMINOCARBOXYLIC ACID DERIVATIVES, AND CINCHONIDINE SALT INTERMEDIATES

Jan M. H. Gubbels, Venlo, and Johannes P. M. Houbiers, Tegelen, both of Netherlands, assignors to Andeno B.V., Venlo, Netherlands

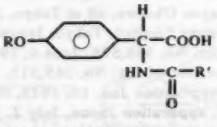
Filed Oct. 30, 1973, Ser. No. 410,990

Claims priority, application Luxembourg, Nov. 11, 1972, 66433

Int. Cl.² C07C 99/12

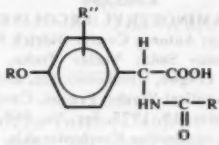
U.S. Cl. 260—284 **16 Claims**

1. Cinchonidine salt of a D-antipode of an α-aminocarboxylic acid of the formula



wherein R is either a hydrogen atom or a methyl or an acetyl radical, and R′ stands for a hydrogen atom or a methyl radical.

2. A process for the chemical separation of racemic modifications of, possibly substituted, α-aminocarboxylic acid derivatives, which process comprises reacting a N-acylated DL-form of an α-aminophenylacetic acid in a solvent, at a temperature in the range from about room temperature to the boiling point of the solvent, with cinchonidine in an amount sufficient at least to form a cinchonidine salt with the amount of D-antipode contained in said acylated DL-form, said reacting being effected for a period of hours, and with cooling of the reaction mixture if it was heated, sufficient to cause the formation of a crystalline precipitate containing a cinchonidine salt of said D-antipode, and selectively isolating said salt from said precipitate; said DL-form being a compound of the formula



in which R is a hydrogen atom, an acyl group, an alkyl group having 1 to 4 carbon atoms or an aralkyl group having up to 11 carbon atoms, R′ is a hydrogen atom or an alkyl group having 1 to 4 carbon atoms or an aryl radical having up to 10 carbon atoms, and R″ stands for hydrogen or hydrogen and one or two halogen atoms.

4,005,089

COMPOUNDS WITH ERGOLINE SKELETON

Erzsébet Magó nee Karácsony; József Borsi; Endre Csányi; Katalin Pik, and Lajos Wolf, all of Budapest, Hungary, assignors to Richter Gedeon Vegyeszeti Gyar Rt., Budapest, Hungary

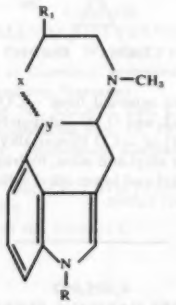
Filed May 22, 1975, Ser. No. 579,979

Claims priority, application Hungary, May 28, 1974, G01272

Int. Cl.² C07D 457/06

U.S. Cl. 260—285.5 **5 Claims**

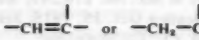
1. A compound of the formula



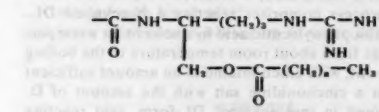
wherein

R is hydrogen or methyl,

$\overset{x}{\overset{|}{\underset{|}{y}}}$ is



and R_1 is



wherein n is an integer of from 4 to 10,
or a pharmaceutically acceptable acid addition salt thereof.

4,005,090

8-(β-AMINOETHYL)ERGOLINES-I

Miroslav Semonsky; Antonin Cerny; Oldrich Nemecek; Karel Rezabek; Miroslav Seda; Vaclav Trcka, and Jaroslava Grimova, all of Prague, Czechoslovakia, assignors to Spofa United Pharmaceutical Works, Prague, Czechoslovakia

Filed Mar. 19, 1975, Ser. No. 560,106

Claims priority, application Czechoslovakia, Mar. 19, 1974, 1971-74

Int. Cl.² C07D *457/02*

U.S. Cl. 260—285.5 **2 Claims**

1. D-6-methyl-8-(β-nicotinoylaminoethyl)ergoline-I.
2. D-1,6-dimethyl-8-(β-nictinoylaminoethyl)ergoline-I.

4,005,091

SUBSTITUTED TRIMETHYLENE CYCLOPROPANES, SALTS THEREOF, INTERMEDIATES AND METHODS OF MAKING THE SAME

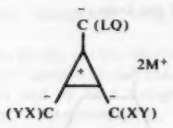
Tadamichi Fukunaga, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 535,138, Dec. 20, 1974, Pat. No. 3,963,769. This application Mar. 2, 1976, Ser. No. 663,101

Int. Cl.² C07C *49/61*

U.S. Cl. 260—286 R **15 Claims**

1. A compound having the formula:



wherein X and Y are selected from —COO (lower alkyl) or —CO (lower alkyl); L and Q are independently selected from —COO (lower alkyl) or —CO (lower alkyl) or pairwise from —H and nitro, lower alkyl and nitro, hydrogen and lower alkyl sulfono, or lower alkyl and lower alkyl sulfono; and M+ is one equivalent of an inert cation.

4,005,092

PYRYLIUM DYES HAVING A FUSED, RIGIDIZED NITROGEN-CONTAINING RING

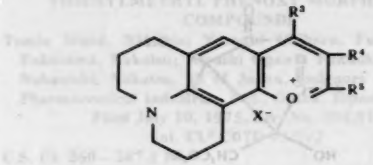
George A. Reynolds, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 389,936, Aug. 20, 1973, Pat. No. 3,932,415, which is a division of Ser. No. 244,916, April 17, 1972, Pat. No. 3,822,270, said Ser. No. 244,916, is a continuation-in-part of Ser. No. 170,349, Aug. 9, 1971, abandoned. This application Oct. 29, 1975, Ser. No. 626,795

Int. Cl.² C07D *491/06*

U.S. Cl. 260—287 P **5 Claims**

1. A compound having the formula:



wherein

R^3 represents hydrogen, alkyl having 1 to 10 carbon atoms, phenyl, carboxyphenyl, ethoxycarbonyl phenyl or when taken together with R^4 represents the carbon atoms necessary to complete a 5- to 7-membered fused ring;

R^4 represents hydrogen or with R^3 represents the carbon atoms necessary to complete a 5- to 7-membered fused ring or when taken together with R^5 represents a 4-hydroxy substituted benzo ring;

R^5 represents hydrogen, hydroxy or when taken together with R^4 represents 4-hydroxy substituted benzo ring; and X^- is an anion.

4,005,093

2-NAPHTHYL-LOWER-ALKYLAMINES

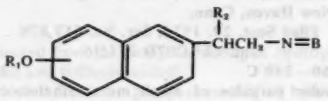
Bernard L. Zenitz, Colonie, N.Y., assignor to Sterling Drug Inc., New York, N.Y.

Filed Jan. 20, 1975, Ser. No. 542,546

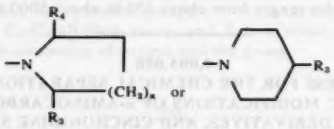
Int. Cl.² C07D *211/14*

U.S. Cl. 260—293.62 **7 Claims**

1. A member of the group consisting of (A) compounds having the formula:



where R_1 and R_2 each represent hydrogen or lower-alkyl and N=B represents one of the groups



where R_3 represents lower-alkyl, cyclohexyl or cyclohexyl-lower-alkyl; R_4 represents hydrogen or lower-alkyl; and n represents one of the integers 1, 2 and 3 and (B) pharmaceutically acceptable acid-addition salts thereof.

4,005,094

PIPERIDINE-SPIRO-HYDANTOIN DERIVATIVES

Keisuku Murayama; Syoji Moriyama; Takao Yoshioka; Toshimasa Toda; Eiko Mori; Hideo Horiuchi; Susumu Higashida; Katsuaki Matsui; Tomoyuki Kurumada; Noriyuki Ohata, and Hisayou Ohsawa, all of Tokyo, Japan, assignors to Sankyo Company Limited, Tokyo, Japan

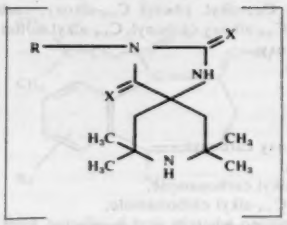
Continuation of Ser. No. 366,575, June 4, 1973, abandoned, which is a continuation of Ser. No. 265,313, June 22, 1972, abandoned. This application Jan. 10, 1975, Ser. No. 540,241

Claims priority, application Japan, July 2, 1971, 46-48646

Int. Cl.² C07D *471/10, 401/14*

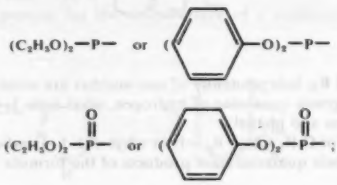
U.S. Cl. 260—293.66 **9 Claims**

1. A compound having the formula



wherein X represents oxygen atom or sulfur atom; *n* is an integer of 1 to 4 inclusive; and

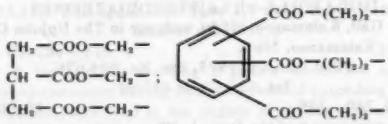
R represents, when *n* is 1: alkenyl of 3 or 4 carbon atoms which may be substituted by halogen; 2-propynyl which may be substituted by phenyl; benzyl or phenethyl which may be substituted by halogen, alkyl of 1 to 4 carbon atoms or halomethyl; hydroxyalkyl of 2 to 4 carbon atoms; methoxyalkyl or ethoxyalkyl with 1 to 8 carbon atoms in the alkyl moiety; 2-vinyloxyethyl; 2-phenoxyethyl; 2-methylthioethyl; 2-acetoxyethyl, 4-decanoyloxybutyl; 2-acryloyloxyethyl, 2-methacryloyloxyethyl; 2-benzoyloxyethyl, 2-m-toluoyloxyethyl; 2,3-epoxypropyl; 2-dimethylaminoethyl; ethoxycarbonylalkyl having 1 to 8 carbon atoms in the alkyl moiety; phenoxycarbonylmethyl; acetyl, propionyl, butyryl; ethoxycarbonyl;



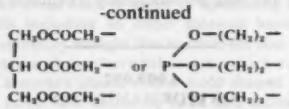
when *n* is 2: an alkenylene group of 4 to 18 carbon atoms; $-(CH_2)_2-O-(CH_2)_2-$;

$-(CH_2)_2-O-CO-CO-O-(CH_2)_2-$; $-(CH_2)_2-O-CO-(CH_2)_2-CO-O-(CH_2)_2-$; $-(CH_2)_2-O-CO-(CH_2)_4-CO-O-(CH_2)_2-$;

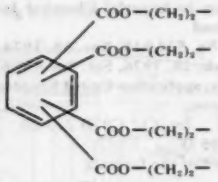
or $-CH_2-CO-O-(CH_2)_2-O-CO-CH_2-$; when *n* is 3:



-continued



and, when *n* is 4:



4,005,095

SUBSTITUTED THIENYL-ACETIC ACID ESTERS

Max Fernand Robba, and Michel Emile Marie Aurousseau, both of Paris, France, assignors to Innothera, Arcueil, France

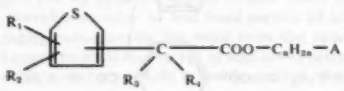
Filed May 20, 1975, Ser. No. 579,069

Claims priority, application France, May 30, 1974, 74.18747

Int. Cl.² C07D *409/12, 333/24*

U.S. Cl. 260—293.68 **5 Claims**

1. A compound of the formula:



in which R_1 and R_2 are independently H, CH_3, C_2H_5, C_3H_7, OCH_3, SCH_3, Cl, Br or NO_2, R_3 and R_4 together are cyclohexylidene, n is 2 or 3, and A is monoalkylamino or dialkylamino, each alkyl radical having 1 to 4 carbon atoms, pyrrolidino or piperidino, racemates, optical isomers, and their pharmaceutically acceptable acid addition salts and quaternary ammonium salts obtained with alkyl halides.

4,005,096

THERAPEUTICALLY ACTIVE PHENOXYALKYLAMINES

Rudolf Theodor Petersen, Wohltorf, and Wolfgang Fleck, Hamburg, both of Germany, assignors to Biersdorf Aktiengesellschaft, Hamburg, Germany

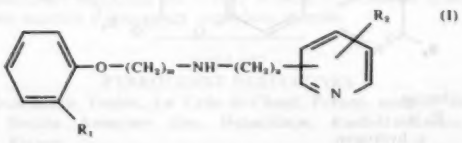
Division of Ser. No. 532,673, Dec. 13, 1974, Pat. No. 3,960,878. This application Feb. 25, 1976, Ser. No. 661,156

Claims priority, application Germany, Dec. 27, 1973, 2364685

Int. Cl.² C07D *213/38*

U.S. Cl. 260—294.9 **3 Claims**

1. Compounds of the formula I:



(I)

wherein

R_1 represents a cyano group;

R_2 represents a hydrogen atom or a methyl or hydroxy group;

m is 2, 3 or 4; and

n is 1 or 2 and their physiologically acceptable acid addition salts.

4,005,097

OXYFORMAMIDATES

John Langshaw Brooks; Richard Budziarek; James William Crook, and Edward Jervis Vickers, all of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

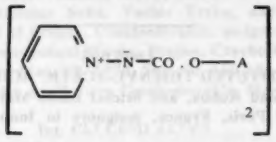
Division of Ser. No. 524,948, Nov. 18, 1974. This application Feb. 20, 1976, Ser. No. 659,636

Claims priority, application United Kingdom, Nov. 30, 1973, 55659/73

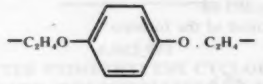
Int. Cl.² C07D *213/20*

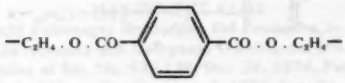
U.S. Cl. 260—295 Q **1 Claim**

1. A compound of the formula



wherein A is a divalent radical selected from the class consisting of





—(CH2) n — where *n* is 4 to 10 and

$-CH_2CH_2-(OCH_2CH_2)_m-$ where *m* is 1 to 6.

4,005,098

TRIAZOLYL-COUMARINS

Alfons Dorlars, Leverkusen; Carl-Wolfgang Schellhammer, Opladen, and Wolf-Dieter Wirth, Cologne-Stammheim, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

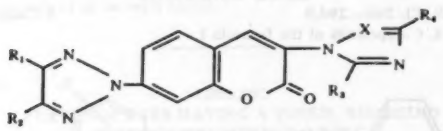
Filed Mar. 12, 1969, Ser. No. 806,732

Claims priority, application Germany, Mar. 16, 1968, 1670999

Int. Cl.² C07D *405/14*

U.S. Cl. 260—308 A **8 Claims**

1. A triazolyl coumarin of the formula



wherein

R_1 is

a. hydrogen;

b. C_{1-12}-alkyl which may be substituted by halogen, hydroxy, C_{1-4} alkoxy, C_{1-4} alkyl carbonyl, COOH, C_{1-4} alkoxycarbonyloxy, phenyl, halo-phenyl, lower alkyl phenyl, or lower alkoxy phenyl;

c. cyclohexyl; or

d. phenyl which may be substituted by fluoro, chloro, bromo, CN, C_{1-4}-alkyl, C_{1-4}-alkoxy, phenyl C_{1-4}-alkyl, carboxy C_{1-4}-alkyl, phenyl C_{1-4}-alkoxy, carboxy C_{1-4}-alkoxy, C_{1-5}-alkoxy carbonyl, C_{1-4}-alkyl sulfonyl, phenyl or phenoxy;

R_2 is H or is

a. R_1;

b. CN;

c. COOH;

d. C_{1-4}-alkoxy carbonyl;

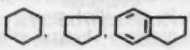
e. $CONH_2$;

f. N-C_{1-4}-alkyl carbonamide;

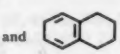
g. N,N-di-C_{1-4}-alkyl carbonamide;

h. or acylamino wherein acyl is selected from the class consisting of alkoxycarbonyl with 1–4 carbon atoms in the alkoxy group; alkyl carbonyl with 1–10 carbon atoms in the alkyl radical; phenyl carbonyl; or substituted acyl as defined above but additionally containing a substituent selected from the class consisting of halogen, amino, phenyl, ethoxy, methoxy, propoxy, methyl, dimethylamino, diethylamino, or dipropylamino;

R_1 and R_2 together with the two carbon atoms of the triazole ring may form a member selected from the group consisting of



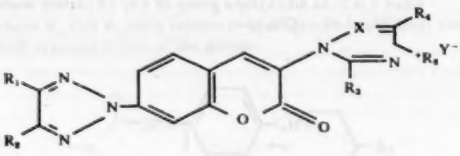
and



and

R_3 and R_4, independently of one another are selected from the group consisting of hydrogen, alkyl with 1–4 carbon atoms and phenyl;

X is N or C-R_5 where R_5 is H or alkyl with 1–4 carbon atoms or their quaternization products of the formula



where Y^- is an anion, and

R_6 is selected from the group consisting of alkyl with 1–12 carbon atoms, which is unsubstituted or substituted by a member of the class consisting of halogen; OH; alkoxy with 1–4 carbon atoms;

alkyl carbonyloxy with 1–4 carbon atoms in the alkyl radical; COOH; alkoxy carbonyl with 1–4 carbon atoms in the alkyl group; phenyl; halophenyl; lower alkyl phenyl, and alkoxy-phenyl.

4,005,099

1-[(DIMETHYLAMINO)-METHYL]-6-ARYL-4H-IMIDAZO[1,5-A][1,4]BENZODIAZEPINES

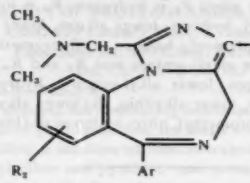
Martin Gall, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Nov. 21, 1975, Ser. No. 634,076

Int. Cl.² C07D *487/04*

U.S. Cl. 260—309 **10 Claims**

1. A compound of the formula III:



III

wherein R_1 is hydrogen or methyl; wherein R_2 is hydrogen, fluoro, chloro, bromo, trifluoromethyl, or nitro; and wherein A_r is phenyl, o-chlorophenyl, o-fluorophenyl, o,o-difluorophenyl, or 2-pyridyl, and the pharmacologically acceptable acid addition salts thereof.

4,005,100
PYRAZOLE-5-CARBOXAMIDES

Hermann Bretschneider; Wilhelm Klotzer, both of Innsbruck, Austria; Gunther Bader, Grafelfing-Lochham, Germany, and August Lutz, Birsfelden, Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

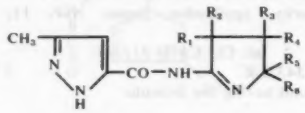
Division of Ser. No. 335,396, Feb. 23, 1973, Pat. No. 3,875,182. This application Jan. 15, 1975, Ser. No. 541,184

Claims priority, application Switzerland, Feb. 28, 1972, 2769/72

Int. Cl.² C07D *403/12*

U.S. Cl. 260—310 R **3 Claims**

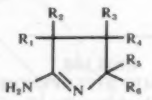
1. A process for the manufacture of a compound of the formula



I

wherein R_1 and R_2 each represent phenyl, lower alkylphenyl or lower alkoxyphenyl and R_3, R_4, R_5 and R_6 each represent a hydrogen atom or a lower alkyl group

which process comprises reacting a compound of the general formula



II

wherein R_1, R_2, R_3, R_4, R_5 and R_6 have the above significance,

with a 3-methylpyrazole-5-carboxylic acid ester or with 2,7-dimethyl-4,9-dioxo-4H,9H-dipyrazolo[1,5-a: 1′,5′-d]pyrazine.

4,005,101
METHOD FOR MOLDING PLASTIC COVERS FOR CONTAINERS

Heinz Ruch, Basel, Switzerland, assignor to Albert Obrist AG, Reinach, Switzerland

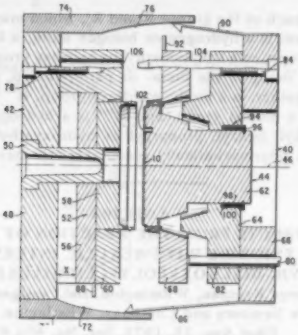
Division of Ser. No. 349,256, April 9, 1973, Pat. No. 3,915,613. This application June 27, 1975, Ser. No. 591,102

Int. Cl.² B29F *1/14*

U.S. Cl. 264—318 **2 Claims**

1. A method for molding a plastic cover for an open mouthed container having a circumferential extending projection on its outer wall in the region of the top thereof, said cover having an inwardly extending portion and an inverted U-shaped rim in the form of a pair of upstanding circumferential sidewalls including an outer sidewall having an outer surface substantially straight line in cross-section and an inner surface having a circumferential recess, which comprises

injecting a molten plastic into a mold shaped to form said plastic cover and including fixed and movable sections forming molding surfaces, said fixed section having a fixed member and a movable member and said movable section having a plurality of movable members,



disengaging the mold from the outer sidewall of said cover by axial movement of said cover relative to the fixed member of said fixed section of said mold,

disengaging the mold from the inner surfaces of said U-shaped rim by axial movement of said cover relative to the movable member of said fixed section of said mold,

disengaging subsequently the mold from the remainder of said cover by axial movement of said cover relative to the movable members of said movable section of said mold, and

removing the molded cover from said mold.

4,005,102
PROCESS FOR MAKING 4-NITRO-N-METHYLPHTHALIMIDE

Newell C. Cook, Schenectady, and Gary C. Davis, Albany, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 486,356, July 8, 1974. This application Aug. 18, 1975, Ser. No. 605,397

The portion of the term of this patent subsequent to June 24, 1992, has been disclaimed.

Int. Cl.² C07D *209/34*

U.S. Cl. 260—326 N **1 Claim**

1. The process for making 4-nitro-N-methylphthalimide which comprises forming a solution of N-methylphthalimide with methylene chloride and concentrated sulfuric acid having a concentration of at least 90%, treating the said phthalimide solution with concentrated nitric acid of at least 90% concentration at a temperature of from −42° to −45° C., the said nitric acid being close to the stoichiometric amount required to attach one nitro group to the N-methylphthalimide, and thereafter extracting the 4-nitro N-methylphthalimide from the reaction mixture with methylene chloride.

4,005,103
PYRROLIDINE DERIVATIVES

Jean-Marie Teulon, La Celle St-Cloud, France, assignor to Societe Anonyme dite: Hexachimie, Rueil-Malmaison, France

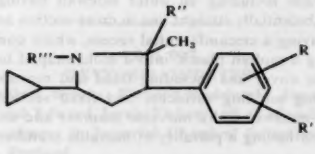
Filed Sept. 11, 1974, Ser. No. 505,084

Claims priority, application United Kingdom, Sept. 27, 1973, 45395/73

Int. Cl.² C07D *207/08*

U.S. Cl. 260—326.5 CA **21 Claims**

1. A compound of formula



wherein each of the groups R and R′, which may be the same or different is a hydrogen or halogen atom, a lower alkyl or alkoxy group, or a trihalomethyl or hydroxy group, the groups R and R′being in the meta- or para-position, or R and R′, taken together, is a methylenedioxy group, R″ is a hydrogen atom or a methyl group, and R‴ is a hydrogen atom or a lower alkyl, benzyl, propargyl or hydroxyethyl group, or a non-toxic pharmaceutically acceptable salt thereof.

4,005,104

PRODUCTS FROM THE REACTION OF SULFUR TRIOXIDE WITH ACYCLIC INTERNAL VIC-DIALKOXYPOLYFLUOROALKENES

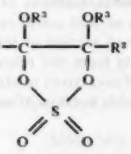
Carl George Krespan, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 15, 1975, Ser. No. 604,932

Int. Cl.² C07D *327/10*

U.S. Cl. 260—327 H **8 Claims**

1. A compound of the formula



wherein: R^1 and R^2, alike or different, are perfluoroalkyl of up to 6 carbons, and R^3 is methyl or ethyl.

4,005,105

SUBSTITUTED 10-ETHYNYLDIBENZO[e,f]THIEPINS AND DIBENZ[b,f]OXEPINS

Jean-Pierre Kaplan, Le Plessis Robinson, France, and Emilio Kyburz, Reinach, Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

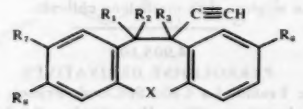
Division of Ser. No. 500,770, Aug. 26, 1974, Pat. No. 3,928,383, which is a continuation-in-part of Ser. No. 380,653, July 12, 1973, abandoned. This application Sept. 15, 1975, Ser. No. 613,680

Claims priority, application Switzerland, June 8, 1973, 8354/73; May 10, 1974, 6421/74

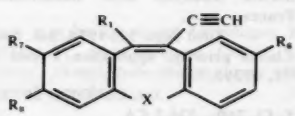
Int. Cl.² C07D *337/14*

U.S. Cl. 260—327 B **2 Claims**

1. A compound of the formula



and



wherein X is oxygen or sulfur; R_1 and R_2, independently, are hydrogen or lower alkyl; R_3 is hydrogen; R_6 is lower alkyl, lower alkyl-sulfonyl, hydroxy, lower alkoxy, lower alkylthio, di-(lower alkyl)-sulfamoyl, halogen, trifluoromethyl, nitro, amino or di-(lower alkyl)-amino; and R_7 and R_8, independently, are hydrogen, lower alkyl-sulfonyl, hydroxy, lower alkyl, lower alkoxy, lower alkylthio, di-(lower alkyl)-sulfamoyl, halogen, trifluoromethyl, nitro, amino or di-(lower alkyl)-amino.

4,005,106

3β-[(METHOXALYL)OXY]-2α-(3-OXO-1-OCTENYL)-5-OXO-1β-CYCLOPENTANEHEPTANOIC ACID AND PROCESS

Norman L. Wendler, Summit; David Taub, Metuchen; Harry L. Slates, Westfield, and Zbigniew S. Zelawski, Piscataway, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 435,812, Jan. 23, 1974, Pat. No. 3,915,994, which is a division of Ser. No. 201,979, Nov. 24, 1971, Pat. No. 3,833,612. This application May 7, 1975, Ser. No. 575,278

Int. Cl.² C07D *317/08*

U.S. Cl. 260—340.9 **2 Claims**

1. 3β-[(methoxalyl)oxy]-2α-(3-oxo-1-octenyl)-5-oxo-1β-cyclopentaneheptanoic acid, 5-cyclic ethylene acetal, and stereoisomers and loweralkyl, benzyl, or xylyl esters thereof.

4,005,107

13-OXABICYCLO(10,4,0)HEXADEC-1(12)-EN-14-ONE

Tsuyoshi Morinaga; Yuji Nakazawa; Kyozo Arimoto; Katuhiko Takahashi, and Yoshiyuki Arai, all of Saitama, all of Japan, assignors to Daicel, Ltd., Osaka, Japan

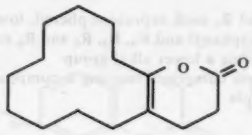
Filed Nov. 6, 1975, Ser. No. 629,391

Claims priority, application Japan, Nov. 11, 1974, 49-129698

Int. Cl.² C07D *311/94*

U.S. Cl. 260—343.2 R **3 Claims**

1. A compound having the formula:



4,005,108

NOVEL ANTI-LEUKEMIC DITERPENOID TRIEPOXIDES

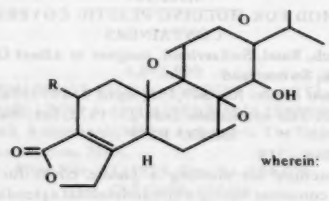
S. Morris Kupchan, Charlottesville, Va., and William A. Court, Delhi, Canada, assignors to Research Corporation, New York, N.Y.

Filed Apr. 3, 1973, Ser. No. 347,599

Int. Cl.² C07D *493/22*

U.S. Cl. 260—343.3 R **4 Claims**

1. A compound selected from the group having the formula:



wherein:

R is hydrogen or hydroxy.

4,005,109

PREPARATION OF PROSTAGLANDIN INTERMEDIATES

Lawrence Libit, 639 Library Place, Evanston, Ill. 60201

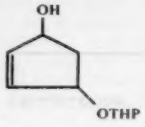
Filed June 24, 1974, Ser. No. 482,083

Int. Cl.² C07D *307/83*

U.S. Cl. 260—343.3 R **6 Claims**

1. In a process for producing intermediates useful in the production of prostaglandins, the steps which comprise:

a. providing a solution of monotetrahydropyranyl ether in diethyl ether and pyridine, said mono-tetrahydropyranyl ether having the formula

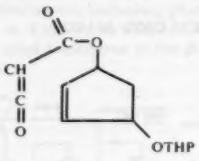


where THP is tetrahydropyranyl,

b. admixing said solution with a malonyl dichloride product in proportions to produce a malonic acid mono-ester chloride of mono-tetrahydropyranyl ether, and

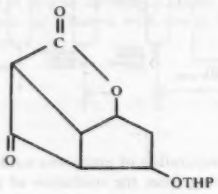
c. then reacting the same with triethylamine in a diethyl ether medium to produce a compound having the formula

(III)



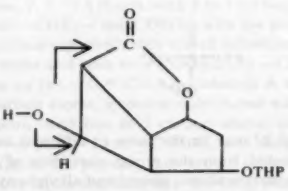
d. heating the Compound (III) in a diethyl ether medium to produce a compound having the formula

(IV)



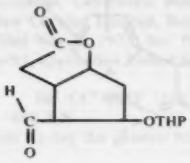
e. reducing Compound (IV) with a reducing agent in the presence of methanol to produce a compound having the formula

(V)



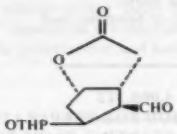
f. effecting cyclobutyl cleavage of Compound (V) to produce a compound having the formula

(VI)



g. and epimerizing Compound (VI) to produce the compound having the formula

(VII)



4,005,110

2H-CYCLOPENTA(b)FURAN-2-ONES

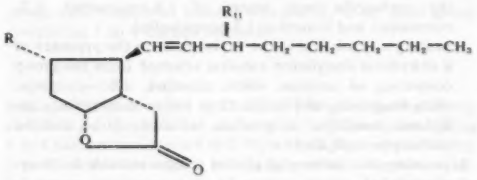
Frank Kienzle, Therwil, Switzerland, and Perry Rosen, North Caldwell, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 381,322, July 20, 1973, abandoned, which is a continuation-in-part of Ser. No. 300,633, Nov. 25, 1972, abandoned. This application Sept. 15, 1975, Ser. No. 613,137

Int. Cl.² C07D *307/87*

U.S. Cl. 260—343.3 R **4 Claims**

1. A compound of the formula:



wherein R is hydrogen, lower alkyl, carboxy or carboxy protected with a group convertible thereto by hydrolysis; and R_{11} is hydroxy or hydroxy protected with a hydrolyzable ether or ester group;

or enantiomers or racemates thereof.

4,005,111

FLUORESCENT DYES

Wolfgang Mach, Hockenheim, and Horst Scheuermann, Ludwigshafen, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

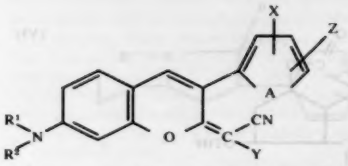
Continuation-in-part of Ser. No. 286,416, Sept. 5, 1972, Pat. No. 3,904,642. This application Jan. 2, 1975, Ser. No. 537,909

Claims priority, application Germany, Sept. 7, 1976, 2144591

Int. Cl.² C07D *311/02*

U.S. Cl. 260—345.2 **6 Claims**

1. A dye of the formula



in which:

R^1 is C_1- to C_4-alkyl, C_2- or C_3-hydroxyalkyl, cyanoethyl or C_3- to C_6-alkoxyalkyl;

R^2 is hydrogen, C_1- to C_4-alkyl or hydroxyethyl;

A is —CH=CH—;

X is hydrogen, cyano or nitro;

Z is hydrogen, chlorine or bromine; and

Y is cyano.

4,005,112

MULTISTEP METHOD FOR PREPARATION OF TETRAHYDROFURAN STARTING FROM PROPYLENE, OXYGEN AND A CARBOXYLIC ACID

William E. Smith, Schenectady, N.Y., assignor to General Electric Company, Pittsfield, Mass.

Division of Ser. No. 420,581, Dec. 3, 1973, abandoned. This application May 27, 1975, Ser. No. 581,265

Int. Cl.² C07D *307/08*

U.S. Cl. 260—346.1 R **2 Claims**

1. A process for preparing tetrahydrofuran which comprises the steps of:

a. reacting propylene, oxygen and a carboxylic acid in the presence of a catalyst comprising a Group VIII noble metal, or its salts, or its oxides or mixtures thereof at a temperature sufficiently high to provide the desired rate of formation of the corresponding allyl carboxylate but below the temperature at which substantial degradation of the allyl carboxylate occurs;

b. converting the allyl carboxylates under hydroformylation-hydrogenation conditions to a mixture comprising the carboxylic acid esters of 1,4-butanediol, 1,2-butanediol and 2-methyl-1,3-propanediol;

c. heating said mixture in the vapor phase in the presence of a dehydroacyloxylation catalyst selected from the group consisting of zeolites, silica, alumina, silica-aluminas. silica-magnesias and acidic clays under substantially anhydrous conditions to produce tetrahydrofuran and the carboxylic acid; and

d. isolating the carboxylic acid in a form suitable for recycling to (a).

4,005,113

MULTI-STEP PROCESS FOR PREPARATION OF TETRAHYDROFURAN STARTING FROM PROPYLENE, OXYGEN AND A CARBOXYLIC ACID

William E. Smith, Schenectady, N.Y., assignor to General Electric Company, Pittsfield, Mass.

Division of Ser. No. 420,853, Dec. 3, 1973, abandoned. This application May 27, 1975, Ser. No. 581,266

Int. Cl.² C07D *307/08*

U.S. Cl. 260—346.1 R **2 Claims**

1. A process for preparing tetrahydrofuran which comprises the steps of:

a. reacting propylene, oxygen, and a carboxylic acid in the presence of a catalyst comprising a Group VIII noble metal, or its salts, or its oxides or mixtures thereof at a temperature sufficiently high to provide the desired rate of formation of the corresponding allyl carboxylate but below the temperature at which substantial degradation of the allyl carboxylate occurs;

b. converting the allyl carboxylate under hydroformylation-hydrogenation conditions to a mixture comprising the carboxylic acid mono and di esters of 1,4-butanediol, 1,2-butanediol and 2-methyl-1,3-propanediol;

c. heating said mixture in the vapor phase at a temperature from about 180° to about 270° C with water in the presence of a hydrolysis-dehydroacyloxylation catalyst selected from the group consisting of zeolites, silica, alumina, silica-aluminas, silica-magnesias and acidic clays to produce tetrahydrofuran and the carboxylic acid; and

d. isolating the carboxylic acid in a form suitable for recycling to (a).

4,005,114

DISTILLATION OF PROPYLENE OXIDE FROM PROPYLENE OXIDATION REACTION PRODUCT IN MIXTURE WITH A PHOSPHORIC ACID ESTER

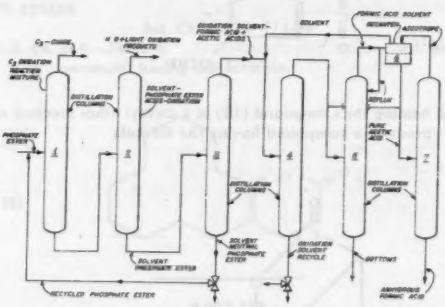
Georges Biola, Venissieux; Alain Fabre, Meyzieu, and Gerard Schneider, Caluire, all of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed Feb. 3, 1975, Ser. No. 546,443

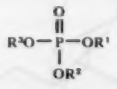
Claims priority, application France, Feb. 11, 1974, 74.05094

Int. Cl.² C07D *301/02*

U.S. Cl. 260—348.5 L **10 Claims**



1. A method for the separation of propylene oxide from the reaction mixture resulting from the oxidation of propylene, which method comprises adding a neutral ester of phosphoric acid having the structural formula:



wherein R^1, R^2 and R^3 may be the same or different and are independently selected from the group consisting of lower alkyl having 1 to 8 carbon atoms, phenyl and alkylphenyl with one or two alkyl groups having from 1 to 3 carbon atoms to said reaction mixture and distilling said reaction mixture to recover a propylene oxide enriched distillate and a distilland.

4,005,115
PHENYL-SUBSTITUTED PROSTAGLANDIN-A TYPE ANALOGS

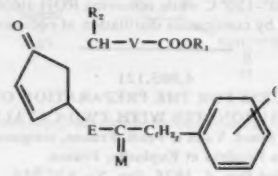
Gordon L. Bundy, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 431,011, Jan. 7, 1974, Pat. No. 3,987,087, which is a continuation-in-part of Ser. No. 167,446, July 29, 1971, abandoned, which is a continuation-in-part of Ser. No. 86,303, Nov. 2, 1970, abandoned. This application Dec. 29, 1975, Ser. No. 645,278

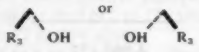
Int. Cl.² C07C *5/22, 69/76*

U.S. Cl. 260—410.9 R **105 Claims**

1. An optically active compound of the formula:



or a racemic compound of that formula and the mirror image thereof, wherein E is $-CH_2CHR_4-$ or trans $-CH=CR_4-$; wherein R_1 is hydrogen, alkyl of one to 8 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive, or ethyl substituted in the β-position with 3 chloro; wherein M is



wherein R_2, R_3 and R_4 are hydrogen or alkyl or one to 4 carbon atoms, inclusive; wherein C_sH_{2s} represents a valence bond or alkylene of one to 10 carbon atoms, inclusive, substituted with zero, one, or 2 fluoro, with one to 7 carbon atoms, inclusive, between

and the phenyl ring; wherein T is alkyl of one to 4 carbon atoms, inclusive, fluoro, chloro, trifluoromethyl, or $-OR_5$, wherein R_5 is hydrogen, or alkyl of one to 4 carbon atoms, inclusive, and s is zero, one, 2, or 3, with the proviso that not more than two T's are other than alkyl; wherein V is (a) alkylene of 3 to 12 carbon atoms, inclusive, substituted with zero, one, 2, 3, or 4 fluoro, with 3 to 7 carbon atoms, inclusive, between $-CHR_2-$ and $COOR_1$, with the proviso that when 3 or 4 fluoro are present, they are all substituents of the carbon atoms alpha and beta to $-COOR_1$, (b) $-CH=CH-A-$, cis or trans, or (c) $-C\equiv C-A-$, wherein A is alkylene of one to 10 carbon atoms, inclusive, substituted with zero, one, 2, 3, or 4 fluoro, with one to 5 carbon atoms, inclusive, between $=CH-$ (or $\equiv C-$) and $-COOR_1$, with the proviso that when 3 or 4 fluoro are present, they are all substituents of the carbon atoms alpha and beta to $-COOR_1$, with the further proviso that when E is $-CH_2-CHR_4-$ V is (a) above; including the lower alkanoates thereof, and the pharmacologically acceptable salts thereof when R_1 is hydrogen.

4,005,116
ORGANOSILICON COMPOUNDS

Brian John Griffiths, Coytrahen, near Bridgend, Wales, assignor to Dow Corning Limited, Barry Glamorgan, Wales

Filed Nov. 6, 1975, Ser. No. 629,269

Claims priority, application United Kingdom, Nov. 27, 1974, 49029/74

Int. Cl.² C07F *7/10, 7/18*

U.S. Cl. 260—448.2 N **5 Claims**

1. Disilazanes having the general formula

$$HN(R_2SiR'SR'')_2$$

wherein each R represents a monovalent radical having from 1 to 8 carbon atoms and free of aliphatic unsaturation which is a hydrocarbon radical, halogenated hydrocarbon radical or hydrocarbonoxy radical, R' represents a divalent aliphatic hydrocarbon radical having from 2 to 6 inclusive carbon atoms and R'' represents a monovalent hydrocarbon radical free of aliphatic unsaturation and having from 1 to 8 inclusive carbon atoms.

4,005,117
ORGANOSILANE COMPOUNDS

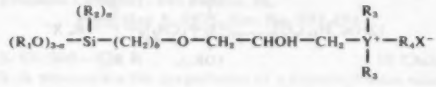
David C. Heckert, Oxford, and David M. Watt, Jr., Cincinnati, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Apr. 22, 1975, Ser. No. 570,531

Int. Cl.² C07F *7/10, 7/18*

U.S. Cl. 260—448.8 R **11 Claims**

1. An organosilane of the formula



or siloxane oligomers thereof wherein R_1 is an alkyl group containing 1 to 4 carbon atoms or

$$Z(OC_xH_{2x})_m$$

where x is 2 to 4, m is 1 to 20, Z is hydrogen, an alkyl group containing 1 to 18 carbon atoms or an acyl group containing 1 to 4 carbon atoms; a is 0 to 2; R_2 is an alkyl group containing 1 to 18 carbon atoms; b is 1 to 3; R_3 is an alkyl, aryl or arylalkyl group containing 1 to 12 carbon atoms, a carboxy-substituted alkyl group containing 1 to 4 carbon atoms,

$$(C_xH_{2x}O)_mZ$$

where x, m and Z are as defined above, or oxygen provided only one R_3 is oxygen and further provided that when R_3 is oxygen there is no X^-; R_4 is an alkyl, aryl or arylalkyl group containing 1 to 22 carbon atoms; X is halide; and Y is nitrogen, phosphorus, or sulfur.

4,005,118
ORGANOSILANE COMPOUNDS

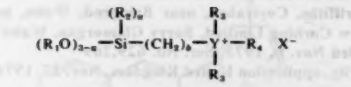
David C. Heckert, Oxford, and David M. Watt, Jr., Cincinnati, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Apr. 22, 1975, Ser. No. 570,532

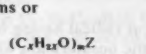
Int. Cl.² C07F *7/10, 7/18*

U.S. Cl. 260—448.8 R **11 Claims**

1. An organosilane having the formula



or siloxane oligomers thereof, wherein R_1 is an alkyl group containing 1 to 4 carbon atoms; a is 0 to 2; R_2 is an alkyl group containing 1 to 18 carbon atoms; b is 1 to 3; at least one R_3 is a carboxy-substituted alkyl group containing 1 to 4 carbon atoms or



wherein x is 2 to 4, m is 1 to 20, Z is hydrogen, an alkyl group containing 1 to 18 carbon atoms, or an acyl group containing 1 to 4 carbon atoms provided m is greater than 1 when Z is hydrogen, while the other R_3 is an alkyl, aryl or arylalkyl group containing 1 to 12 carbon atoms; R_4 is an alkyl, aryl or arylalkyl group containing 1 to 22 carbon atoms; X is halide; and Y is nitrogen, phosphorus or sulfur.

4,005,119

ORGANOSILANE COMPOUNDS

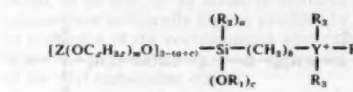
David C. Heckert, Oxford; David M. Watt, Jr., Cincinnati, both of Ohio, assignor to The Proctor & Gamble Company, Cincinnati, Ohio

Filed Apr. 22, 1975, Ser. No. 570,539

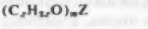
Int. Cl.² C07F 7/10, 7/18

U.S. Cl. 260—448.8 R **14 Claims**

1. An organosilane having the formula



or siloxane oligomers thereof, wherein x is 2 to 4, m is 1 to 20, Z is hydrogen, an alkyl group containing 1 to 18 carbon atoms or an acyl group containing 1 to 4 carbon atoms; a is 0 to 2; c is 0 to 2 provided a+c does not exceed 2; R_1 is an alkyl group containing 1 to 4 carbon atoms; R_2 is an alkyl group containing 1 to 18 carbon atoms, b is 1 to 3; R_3 is an alkyl, aryl or arylalkyl group containing 1 to 12 carbon atoms, a carboxy-substituted alkyl group containing 1 to 4 carbon atoms,



where x, m, and Z are as defined above, or oxygen provided only one R_3 is oxygen and further provided that when R_3 is oxygen there is no X^-; R_4 is an alkyl, aryl, or arylalkyl group containing 1 to 22 carbon atoms; X is halide; and Y is nitrogen, phosphorus, or sulfur.

4,005,120

PROCESS FOR MAKING DIALKOXIBORACETYLACETONATE CONTAINING MIXTURES

Gerhard Kunstle, Raitenhaslach, and Herbert Siegl, Haiming, both of Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

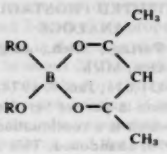
Filed Jan. 7, 1975, Ser. No. 539,132

Claims priority, application Germany, Jan. 18, 1974, 2402426

Int. Cl.² C07F 5/04

U.S. Cl. 260—462 R **5 Claims**

1. A process for making mixtures containing dialkoxiboracetylacetonate of the general formula



wherein R represents a member selected from the group consisting of aliphatic straight chain and branched chain, saturated and unsaturated hydrocarbon group with 1–8 carbon atoms, the process consisting of reacting boric acid trialkyl esters of the general formula $B(OR)_3$, wherein R has the meaning defined above, with acetylacetone at temperatures ranging from 10°–150° C while removing ROH alcohol formed in the reaction by continuous distillation at reduced pressure.

4,005,121

PROCESS FOR THE PREPARATION OF OLIGOCARBONATES WITH TWO CATALYSTS

Jean-Pierre G. Senet, Vaux le Penil, France, assignor to Societe Nationale des Poudres et Explosifs, France

Filed Dec. 4, 1975, Ser. No. 637,758

Claims priority, application France, Dec. 11, 1974, 74.40839

Int. Cl.² C07C 68/06

U.S. Cl. 260—463 **9 Claims**

1. A process for the preparation of aliphatic polycarbonate-diols by transesterification between a diol and diethyl carbonate, which comprises the following two stages:

I. transesterification carried out in the presence of a basic catalyst at a temperature below about 140° C, and

II. after complete destruction of the basic catalyst, the transesterification is completed in the presence of an acid catalyst at a temperature of from about 200° to about 250° C.

4,005,122

POLYHALO POLY CYCLOCARBOXYLIC ACID COMPOUNDS

Steven A. Cerefice, Naperville, and Ellis K. Fields, River Forest, both of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Oct. 23, 1975, Ser. No. 625,191

Int. Cl.² C07C 61/28, 69/74

U.S. Cl. 260—468 G **6 Claims**

1. A polyhalocompound selected from at least one member of the group consisting of 7,7-dihalobicyclo [4.1.0] hept-4-ene-2,3-dicarboxylic acid ester and 5,5,8,8-tetrahalotricyclo [5.1.0.0^{4,6}] octane-2,3-dicarboxylic acid ester wherein said halo groups are selected from at least one member of the group consisting of fluoro, chloro and bromo and said ester groups are at least one member selected from the group consisting of aliphatic groups containing from 1 to 24 carbon atoms, aromatic groups containing from 6 to 24 carbon atoms and aralkyl groups containing from 7 to 25 carbon atoms.

4,005,123

SUBSTITUTED PHENYLISOTHIOUREAS AND PROCESSES FOR THEIR PREPARATION AND USE

Heinrich Kolling, Haan; Herbert Thomas, Wuppertal; Arno Widdig, Biecher, and Hartmund Wollweber, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

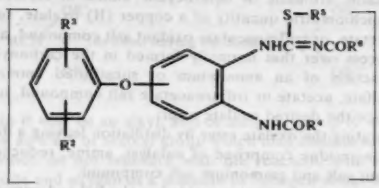
Filed July 11, 1975, Ser. No. 595,040

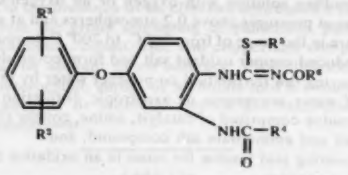
Claims priority, application Germany, July 16, 1974, 2434183

Int. Cl.² C07C 149/40

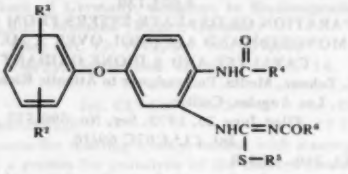
U.S. Cl. 260—470 **10 Claims**

1. A compound selected from the group consisting of a 4-phenoxy-2-amidophenylisothiourea of the formula:





and a 5-phenoxy-2-amidophenylisothiourea of the formula:



wherein

R^4 is alkyl of 1 to 6 carbon atoms, cycloalkyl of 3 to 10 carbon atoms, alkenyl of 2 to 4 carbon atoms, alkynyl of 2 to 4 carbon atoms, phenyl, phenylalkyl of 7 to 12 carbon atoms, alkoxyalkyl of 2 to 12 carbon atoms, phenoxyalkyl of 7 to 12 carbon atoms;

R^5 is alkyl of 1 to 6 carbon atoms, alkenyl of 2 to 6 carbon atoms of alkynyl of 2 to 6 carbon atoms; and

R^6 is alkoxy of 1 to 6 carbon atoms, alkenyloxy of 2 to 6 carbon atoms, alkynyloxy of 2 to 6 carbon atoms, or alkoxyalkoxy of 2 to 12 carbon atoms;

each of R^2 and R^3 independent of the other is hydrogen, halogeno, alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, alkylthio of 1 to 6 carbon atoms, trifluoromethyl, alkanoyl of 1 to 6 carbon atoms, amino, alkanoylamino of 1 to 6 carbon atoms, or carbalkoxy of 2 to 7 carbon atoms.

4,005,124

PROCESS FOR RECOVERING THE MOTHER LIQUOR PRODUCED BY THE ESTERIFICATION OF TEREPHTHALIC ACID WITH METHANOL

Ferdinand List, Marl; Wilfried Uhlenbrock, Bochum; Norbert Wilke, and Kurt Wember, both of Marl, all of Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Filed Nov. 20, 1974, Ser. No. 525,516

Claims priority, application Germany, Nov. 28, 1973, 2359199

Int. Cl.² C07C *69/82*

U.S. Cl. 260—475 R **23 Claims**

1. In a process for the preparation of dimethyl terephthalate comprising the steps of esterifying with excess methanol a crude terephthalic acid containing as impurities terephthaldehyde acid, acetic acid and tolic acid to obtain a solid phase of crystallized high purity dimethylterephthalate and predominantly methanolic mother liquor containing minor quantities of dissolved dimethyl terephthalate, monomethyl terephthalate, methyl ester of terephthaldehydic acid, methyl ester of toluic acid, and methyl acetate; separating said crystallized high purity dimehyl terephthalate from said mother liquor, the improvement comprising adjusting said separated mother liquor containing esterification water and about 1.0 to 6.0 percent by weight dissolved solids to a specific gravity of about 0.85 to 0.98 by addition of water to the mother liquor and by evaporation of methanol from the mother liquor at a temperature of about 65°–85° C, cooling said separated mother liquor to a temperature of about 10°–30° C to precipitate said solids and separating said solids from a twice separated mother liquor.

4,005,125

PREPARATION OF HALOALKYL ESTERS

Louis Schmerling, Riverside, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed May 5, 1975, Ser. No. 574,493

Int. Cl.² C07C *67/24*

U.S. Cl. 260—476 R **13 Claims**

1. A process for the preparation of a haloalkyl ester which comprises reacting a hydrocarbon carboxylic acid containing from 1 to about 20 carbon atoms or anhydride thereof and a hydrogen halide or hydrohalic acid with a saturated cyclic ether selected from the group consisting of tetrahydrofuran, tetrahydropyran, halogen-substituted tetrahydrofurans and tetrahydropyrans and alkyl-substituted tetrahydrofurans and tetrahydropyrans in which the alkyl contains from 1 to about 6 carbon atoms in the presence of a Friedel-Crafts metal halide catalyst at a temperature of from about 20° to about 250° C., and recovering the resultant haloalkyl ester.

4,005,126

PREPARATION OF HALOALKYL ESTERS

Louis Schmerling, Riverside, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed May 5, 1975, Ser. No. 574,494

Int. Cl.² C07C *67/24*

U.S. Cl. 260—476 R **10 Claims**

1. A process for the preparation of a haloalkyl ester which comprises reacting, at a temperature of from about ambient to about 100° C., a hydrocarbon carboxylic acid containing from 1 to about 20 carbon atoms or anhydride thereof and a hydrogen halide or hydrohalic acid with a saturated cyclic ether selected from the group consisting of tetrahydrofuran, tetrahydropyran, halogen-substituted tetrahydrofurans and tetrahydropyrans and alkyl-substituted tetrahydrofurans and tetrahydropyrans in which the alkyl contains from 1 to about 6 carbon atoms, and recovering the resultant haloalkyl ester

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4,005,127

L-DOPA PROCESS AND INTERMEDIATES

William S. Knowles, St. Louis; Milton J. Sabacky, Ballwin, and Billy D. Vineyard, Creve Coeur, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Continuation of Ser. No. 122,185, March 8, 1971, abandoned. This application Aug. 6, 1975, Ser. No. 602,484

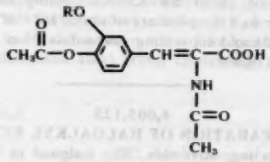
Int. Cl.² C07C *103/27*

U.S. Cl. 260—479 R **13 Claims**

1. A process comprising catalytically asymmetrically hydrogenating α-acetamido-4-hydroxy-3-alkoxy-cinnamic acid acetate, in the presence of a homogeneous, optically active coordination complex of a metal selected from the group consisting of rhodium, iridium, ruthenium, osmium, palladium and platinum in combination with at least one optically active phosphine or arsine ligand to form N-acetyl-3-(4-hydroxy-3-alkoxyphenyl)-L-alanine acetate in a major amount and N-acetyl-3-(4-hydroxy-3-alkoxyphenyl)-D-alanine acetate in a minor amount and recovering a portion of the N-acetyl-3-(4-hydroxy-3-alkoxyphenyl)-L-alanine acetate by crystallization and hydrolyzing the recovered N-acetyl-3-(4-hydroxy-3-alkoxyphenyl)-L-alanine acetate to 3-(3,4-dihydroxyphenyl)-

L-alanine; provided that said α-acetamido-4-hydroxy-3-alkoxy-cinnamic acid acetate, N-acetyl-3-(4-hydroxy-3-alkoxyphenyl)-L-alanine acetate and N-acetyl-3-(4-hydroxy-3-alkoxyphenyl)-D-alanine acetate may be present as the acid, a salt formed with a base or mixtures of the acid and a salt formed with a base.

11. A compound represented by the structural formula



and its salts formed with a base, wherein, R is alkyl of from 1 to 3 carbon atoms.

4,005,128

PROCESS FOR THE PREPARATION OF OXALATE ESTERS

Lee R. Zehner, Media, Pa.; Richard W. Sauer, deceased, late of Cherry Hill, N.J., and John J. Heffron, executor, Morrisville, Pa., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Apr. 2, 1975, Ser. No. 564,242
Int. Cl.² C07C 69/36
U.S. Cl. 260—485 R **17 Claims**

1. A process for the preparation of oxalate esters of an alcohol having from 1 to 20 carbon atoms which comprises reacting under substantially anhydrous conditions, a saturated monohydric aliphatic or alicyclic alcohol which may contain other substituents which do not interfere with the reaction or an aromatic alcohol selected from the group consisting of benzyl, chlorobenzyl and methoxy-benzyl alcohols with carbon monoxide at a pressure of between about 1 and 700 atmospheres and at a temperature in the range of about 50° to 250° C. in the presence of an effective amount of a catalyst selected from the group consisting of palladium (II), rhodium (III), platinum (II) and copper (I) or (II) salt compounds and at least a stoichiometric amount of an aliphatic, cycloaliphatic, aromatic or heterocyclic amine or ammonia and at least a stoichiometric amount of a copper (II) or iron (III) oxalate, sulfate, acetate, or trifluoroacetate oxidant salt compound and recovering the desired oxalate ester.

4,005,129

PROCESS FOR THE OXIDATIVE CARBONYLATION OF ALCOHOLS AND METHOD FOR THE REOXIDATION OF REDUCED COPPER SALTS PRODUCED BY THE OXIDATION CARBONYLATION

Lee R. Zehner, Media, Pa., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed June 4, 1975, Ser. No. 583,810
Int. Cl.² C07C 69/36
U.S. Cl. 260—485 R **22 Claims**

1. A cyclic process for the oxidative carbonylation of an alcohol having from 1 to 20 carbon atoms which comprises the steps of

reacting under substantially anhydrous conditions, a saturated monohydric aliphatic or alicyclic alcohol which may contain other substituents which do not interfere with the reaction or an aromatic alcohol selected from the group consisting of benzyl, chlorobenzyl and methoxy-benzyl alcohols with carbon monoxide at a pressure of between about 1 to 700 atmospheres and at a temperature in the range of about 50° C. to 250° C. in the presence of an effective amount of a catalyst selected from the group consisting of palladium (II), rhodium (III), platinum (II) and copper (I) or (II) salt compounds, at least a stoichiometric amount of an aliphatic, cycloaliphatic, aromatic or heterocyclic amine or ammonia, a stoichiometric quantity of a copper (II) oxalate, sulfate, acetate, or trifluroacetate oxidant salt compound, and an excess over that normally formed in the carbonylation reaction of an ammonium or substituted ammonium sulfate, acetate or trifluroacetate salt compound, to produce the desired oxalate ester;

separating the oxalate ester by distillation leaving a distillation residue comprised of catalyst, amine, reduced oxidant salt and ammonium salt compound;

dissolving the distillation residue in alcohol and purging the resulting solution with oxygen or an oxygen-containing gas at pressures above 0.2 atmospheres and at a temperature in the range of from 20° C. to 200° C. to reoxidize the reduced copper oxidant salt and form co-product water;

removing the reoxidation co-product water by the addition of water scavengers or azeotropic distillation leaving a residue comprised of catalyst, amine, copper (II) oxidant salt and ammonium salt compound; and

recovering said residue for reuse in an oxidative carbonylation process.

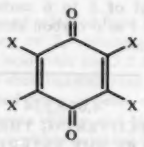
4,005,130

PREPARATION OF OXALATE ESTERS FROM CARBON MONOXIDE AND ALCOHOL OVER A METAL CATALYST AND A DIONE OXIDANT

Lee R. Zehner, Media, Pa., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed June 26, 1975, Ser. No. 590,527
Int. Cl.² C07C 69/36
U.S. Cl. 260—485 R **10 Claims**

1. A process for the oxidative carbonylation of an alcohol having from 1 to 20 carbon atoms, which may contain other substituents which do not interfere with the reaction, to produce oxalate esters which comprises reacting under substantially anhydrous conditions, a saturated monohydric aliphatic or alicyclic alcohol or an aromatic alcohol selected from the group consisting of benzyl, chlorobenzyl and methoxy-benzyl alcohols with carbon monoxide at a pressure of from 200 psi to 5000 psi and at a temperature in the range of about 80° to 200° C. in the presence of an effective amount of a catalyst selected from the group consisting of a copper, nickel, cobalt, cadmium and zinc metal salt compounds and at least a stoichiometric amount of a 2,5-cyclohexadiene-1,4-dione oxidant having the formula



wherein x may be hydrogen or halogen and recovering the desired oxalate ester.

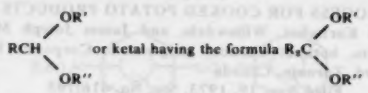
4,005,131

SYNTHESIS OF OXALATE ESTERS FROM CARBON MONOXIDE AND ACETALS OR KETALS

Lee R. Zehner, Media, Pa., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Jan. 2, 1976, Ser. No. 646,118
Int. Cl.² C07C 69/36
U.S. Cl. 260—485 R **25 Claims**

1. A process for the preparation of oxalate esters which comprises reacting under substantially anhydrous conditions, an acetal having the formula



wherein R may be an alkyl, aryl or alicyclic group R′ and R″ may be an alkyl or aralkyl group which may contain substituents which do not interfere with the reaction, with carbon monoxide and oxygen at a pressure of between about 500 psi and 3000 psi and at a temperature in the range of about 50° C. to 200° C. in the presence of an effective amount of a catalyst selected from the group consisting of palladium, platinum, rhodium, cadmium, cobalt, zinc and copper salt compounds and a catalytic amount of an aliphatic, cycloaliphatic, aromatic or heterocyclic amine or ammonia and a monohydric aliphatic, alicyclic or aromatic alcohol and recovering the desired oxalate ester.

4,005,132

PROCESS FOR REACTING TRIALKYL BORANES WITH COMPOUNDS CONTAINING PROTONS

Roland Koster, Mulheim (Ruhr), and Hans Bellut, Wanne-Eickel, both of Germany, assignors to Studiengesellschaft Kohle m.b.H., Mulheim (Ruhr), Germany

Filed Oct. 12, 1972, Ser. No. 297,146

Claims priority, application Germany, Oct. 14, 1971, 2151233

Int. Cl.² C07F *5/02*

U.S. Cl. 260—502.3 **19 Claims**

1. A process for reacting trialkyl borane with a compound containing a proton for protolysis of the trialkyl borane and said compound involving said proton, said compound being a compound having the proton bonded to 0 or N, with the proviso that when the proton is bonded to the residue by 0, the residue is other than acyl, an HS compound wherein H in said HS is said proton, or hydrogen halide, wherein the hydrogen in said hydrogen halide is said proton, which comprises carrying out the reaction in the presence of catalytic amount of a carboxylic acid derivative which is a catalyst for the reaction.

4,005,133

$PGF_{2\alpha}$, L-ARGININE SALT

Walter Morozowich, Kalamazoo Township, Kalamazoo County, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Oct. 14, 1975, Ser. No. 622,129

Int. Cl.² C07C *101/24*

U.S. Cl. 260—561.11 **2 Claims**

1. $PGF_{2\alpha}$, L-arginine salt.

2. The free-flowing solid form of $PGF_{2\alpha}$, L-arginine salt.

4,005,134

METHOD FOR MAKING AROMATIC BIS(ETHER DICARBOXYLIC ACID)

Ronald L. Markezich, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Sept. 11, 1975, Ser. No. 612,368

Int. Cl.² C07C *51/00*

U.S. Cl. 260—520 E **6 Claims**

1. In a method for making an aromatic bis(ether dicarboxylic acid) based on the hydrolysis of an aromatic bis(ether N-organophthalimide), the improvement which comprises heating a mixture of aromatic bis(ether N-organophthalimide, acetic acid, water and mineral acid in a closed system at a temperature in the range between about 80° C to 200° C, where the mineral acid is used in the mixture at a concentration sufficient to provide from 2 to 8 moles of mineral acid per mole of bisimide and there is utilized a proportion by weight of from about 1 part to 20 parts of glacial acetic acid and from about 1 part to 10 parts of water per part of bisimide which is used in the mixture in a proportion of from 10% by weight to 30% by weight, whereby the direct hydrolysis of the aromatic bis(ether N-organophthalimide) is achieved without resort to a base hydrolysis step followed by acidification of the resulting tetraacid salts.

4,005,135

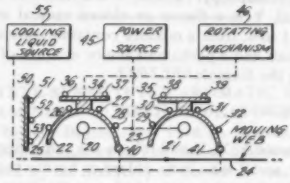
ROTATABLE ULTRAVIOLET LAMP REFLECTOR AND HEAT SINK

Norman A. Helding, Chicago, Ill., assignor to Sun Chemical Corporation, New York, N.Y.

Filed Apr. 7, 1975, Ser. No. 565,601

Int. Cl.² B01K *1/00;* **F21V** *29/00;* **F26B** *3/28*

U.S. Cl. 250—527 **12 Claims**



1. Apparatus for curing photopolymerizable materials which are moved in a plane, comprising a plurality of spaced parallel disposed lamp and reflector assemblies which are elongated along lines parallel to said plane and generally perpendicular to the direction of movement of said photopolymerizable materials; each of said lamp and reflector assemblies consisting of an elongated lamp disposed within an elongated reflector which is generally curved partially around said lamp and which terminates on two parallel-extending edges which are parallel to said lamp, whereby said generally curved reflector focuses the radiation of said lamp beyond said two parallel-extending edges of said reflector and toward objects which face said lamp; means for rotatably mounting each of said lamp and reflector assemblies comprising pivotal mounting means which is generally coaxial with corresponding ones of said two parallel-extending edges of each of said reflectors; and means for simultaneously rotating each of said lamp and reflector assemblies between a first position at which the radiation of said lamps is directed toward said plane to a second position at which the radiation of at least one of said lamps is directed toward the rear surface of the reflector of an adjacent lamp and reflector assembly.

4,005,136

GRANULES OF SALTS OF POLY-α-HYDROXYACRYLIC ACIDS AND A PROCESS FOR THEIR MANUFACTURE

Jean Brichard, Vilvoorde, Belgium, assignor to Solvay & Cie, Brussels, Belgium

Filed June 10, 1975, Ser. No. 585,587

Claims priority, application France, July 11, 1974, 74-24603

Int. Cl.² C07C *59/17*

U.S. Cl. 260—535 P **10 Claims**

1. Granules of alkali metal or ammonium salts of substituted or unsubstituted poly-α-hydroxyacrylic acids, wherein their apparent specific gravity under free flow is between 0.35 and 0.55 kg/dm³ and their ability to flow, expressed by the time taken for a weight of 250 g to flow through a 16 mm diameter orifice of an analysis funnel with a short stem, does not exceed 10 seconds.

4,005,137

PROCESS FOR THE PURIFICATION AND SEPARATION OF PERHALOALKANOIC ACIDS FROM MIXTURES THEREOF WITH PERHALOALKANES

Werner Rudolph, Anderten, Hannover, and Joachim Massonne, Hannover, both of Germany, assignors to Kali-Chemie Aktiengesellschaft, Hannover, Germany

Filed Feb. 10, 1975, Ser. No. 548,818

Claims priority, application Germany, Feb. 19, 1974, 2407834

Int. Cl.² C07C *5/42*, *53/34*

U.S. Cl. 260—539 R 6 Claims

1. A process for the separation and purification of a perhaloalkanoic acid or mixture of perhaloalkanoic acids having the formula

$$A-(CFX-CFY)_n-CFX-COOH$$

in which A is a perfluoromethyl, perfluoroethyl, perfluoropropyl or perfluoroisopropyl radical, X is a fluoro or a trifluoromethyl radical, Y is a fluoro or chloro radical and n is an integer from 1 to 4, from a mixture containing the said acid or mixture of acids and a perhaloalkane or mixture of perhaloalkanes having the formula

$$A-(CFX-CFY)_n-CFX-CFYZ$$

in which formula A, X, Y and n have the same significance as hereinbefore, and Z is an iodo, chloro or bromo radical, which comprises adsorbing the said mixture in the form of a liquid upon a chromatographic column of adsorbent silica gel particles and subsequently eluting the perhaloalkane or perhaloalkanes therefrom first with a weakly polar eluent selected from the group consisting of chlorofluoroalkanes, tetrachloromethane, chloroform, benzene and petroleum ether, and then with a strongly polar eluent selected from the group consisting of ethyl acetate, diethyl ether, acetone and methanol.

4,005,138

PROCESS FOR THE MANUFACTURE OF SULPHONIC ACID FLUORIDES

Eric Plattner, Seltisberg, and Christos Comninellis, Prilly, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Sept. 9, 1974, Ser. No. 504,582

Claims priority, application Switzerland, Sept. 11, 1973, 13025/73

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² C07C *143/70*

U.S. Cl. 260—543 F 13 Claims

1. A process for the manufacture of sulphonic acid fluorides of the formula

$$R\,SO_2F,$$

wherein R represents a straight-chain or a branched alkyl or cycloalkyl radical, which comprises reacting thio compounds of the formula

$$R-S-X,$$

wherein R has the meaning previously assigned to it and X represents hydrogen or the radical —S—R, with nitrogen dioxide or dinitrogen tetroxide in the presence of liquid hydrogen fluoride.

4,005,139

PROCESS FOR COOKED POTATO PRODUCTS

Cornelis Kortschot, Willowdale, and James Joseph Miller, Toronto, both of Canada, assignors to Corporate Foods Limited, Toronto, Canada

Filed Nov. 19, 1973, Ser. No. 416,795

Claims priority, application Canada, Sept. 28, 1973, 182190

Int. Cl.² A23L *1/10*

U.S. Cl. 426—550 12 Claims

1. A continuous method for the production of cooked potato products which comprises the steps of:

a. rapidly mixing dehydrated potato solids with water in an amount sufficient to hydrate the potato solids and to form a stiff dough suitable for frying, said mixing being sufficiently rapid and severe to form a homogeneous, pourable, low viscosity slurry of said potato solids and water before formation of said stiff dough;

b. pouring said slurry onto a surface to form said slurry into a desired shape while it is still pourable and before formation of said stiff dough;

c. permitting the shaped slurry to transform by hydration into a stiff dough suitable for frying; and

d. cooking said stiff dough.

4,005,140

UREIDOTETRALIN COMPOUNDS

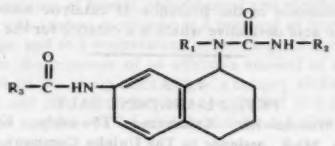
Larry Dean Spicer, Princeton; Joseph Michael Pensack, Trenton; Robert Daniel Wilbur, Titusville, and Gary Michael Demkovich, Cranbury, all of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 440,625, Feb. 7, 1974, Pat. No. 3,953,506. This application Jan. 26, 1976, Ser. No. 652,353

Int. Cl.² A01N *9/20*; A61K *31/17*; C07C *127/19*, *157/09*

U.S. Cl. 260—553 A 8 Claims

1. A compound of the formula:



wherein R_1 is selected from the group consisting of hydrogen and alkyl having up to four carbon atoms, R_2 is selected from the group consisting of hydrogen and alkyl having up to four carbon atoms, and R_3 is selected from the group consisting of methyl and monoalkylamino having one to twelve carbon atoms.

4,005,141

PERFLUOROALKYLSULFONAMIDOARYL COMPOUNDS

George G. I. Moore, Birchwood, and Joseph Kenneth Harrington, Edina, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

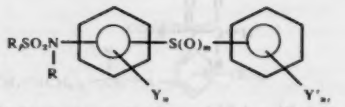
Continuation-in-part of Ser. No. 268,661, July 3, 1972, abandoned, which is a continuation-in-part of Ser. No. 118,476, Feb. 24, 1971, abandoned, which is a continuation-in-part of Ser. No. 28,148, April 13, 1970, abandoned. This application Apr. 15, 1974, Ser. No. 460,883

The portion of the term of this patent subsequent to Oct. 8, 1991, has been disclaimed.

Int. Cl.² C07C *143/74*

U.S. Cl. 260—556 F 50 Claims

1. A compound of the formula



wherein R_f is a lower perfluoroalkyl radical having one or two carbon atoms, R is hydrogen, alkyl, alkylsulfonyl, a horticulturally acceptable cation or

where R' is alkyl, *m* is 0–2, Y is halogen, alkyl, alkoxy, nitro, amino, alkanamido, hydroxy, dialkylamino, alkylthio, alkylsulfonyl, alkanoyl, dialkylsulfamoyl or alkylsulfinyl, Y' is fluorine, alkyl, alkoxy, nitro, amino, alkanamido, hydroxy, dialkylamino, alkylthio, alkylsulfonyl, alkanoyl, dialkylsulfamoyl or alkylsulfinyl and *n* and *n'* are independently 0–2 provided that the individual aliphatic groups appearing in the R, R', Y and Y' moieties contain from one to four carbon atoms each.

4,005,142
FLUOROCARBON ETHER BIS(O-AMINOPHENOL) COMPOUNDS

Robert C. Evers, Dayton, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Sept. 4, 1975, Ser. No. 610,470
Int. Cl.² C07C *91/44, 93/14*
U.S. Cl. 260—571 **3 Claims**

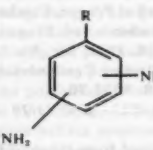
1. As a new composition of matter, a compound selected from the group consisting of 1,14-bis(3-amino-4-hydroxyphenyl)perfluoro-5,10-dimethyl-3,6,9,12-tetraoxatetradecane and 1,17-bis(3-amino-4-hydroxyphenyl)perfluoro-3,6,9,15-tetraoxaheptadecane.

4,005,143
PROCESS FOR MANUFACTURING AROMATIC DIAMINES

Walter Bohm, Leverkusen; Helmuth Kritzler, Odenthal, and Lutz Neumann, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

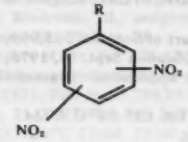
Filed July 9, 1975, Ser. No. 594,417
Claims priority, application Germany, July 25, 1974, 2435818
Int. Cl.² C07C *93/26, 85/11*
U.S. Cl. 260—575 **7 Claims**

1. Process for preparing an aromatic diamine having the formula



wherein

R is an alkyl or alkoxy group having up to 6 carbon atoms which comprises contacting in the presence of a solvent selected from the group consisting of aniline, O-toluidine and m-toluidine a dinitro compound of the formula



wherein

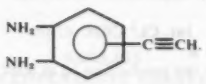
R is as defined above with hydrogen in the presence of a catalyst containing at least one metal of period 5 or 6 of Group VII of the Periodic Table, said catalyst being present in an amount of 0.0005 to 0.1% by weight metal, based upon the amount of dinitro compound being reacted.

4,005,144
ETHYNYL-SUBSTITUTED AROMATIC ORTHO DIAMINES AND METHOD OF SYNTHESIS

Robert F. Kovar, Dayton, and Fred E. Arnold, Centerville, both of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Division of Ser. No. 578,847, May 19, 1975, Pat. No. 3,975,444. This application Apr. 9, 1976, Ser. No. 675,677
Int. Cl.² C07C *87/50, 93/06*
U.S. Cl. 260—578 **3 Claims**

1. A compound having the following formula:



4,005,145
PROCESS FOR THE MANUFACTURING OF OXO COMPOUNDS

Erich Widmer, Munchenstein, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Feb. 21, 1975, Ser. No. 551,945
Claims priority, application Switzerland, Mar. 1, 1974, 2933/74; Jan. 30, 1975, 1124/75
Int. Cl.² C07C *45/00*
U.S. Cl. 260—586 R **15 Claims**

1. A process for isomerizing an α,β-unsaturated oxo compound to a β,γ-unsaturated oxo compound comprising boiling an α,β-unsaturated oxo compound in the presence of a catalyst, said catalyst being an acid having a pK value at room temperature and atmospheric pressure of from 2 to 5, a boiling point of greater than that of said β,γ-unsaturated oxo compound and which is stable under the reaction conditions, said catalyst being selected from the group consisting of

a. monocyclic, aromatic or alicyclic monocarboxylic, dicarboxylic or polycarboxylic acids which may contain a hetero atom and/or be ring-substituted;

b. an acid selected from the group consisting of adipic acid, 12-hydroxystearic acid, benzilic acid and diglycolic acid; and

c. aliphatic or aromatic amino acids;

to form said β,γ-unsaturated oxo compound which is collected in the distillate.

4,005,146

RESOLUTION OF DL-ALLETHROLONE

Bernard Goffinet, Paris, France, assignor to Roussel-UCLAF, Paris, France

Continuation-in-part of Ser. No. 315,999, Dec. 18, 1972, abandoned. This application Sept. 24, 1975, Ser. No. 616,413

Claims priority, application France, Dec. 28, 1971, 71.46981

Int. Cl.² C07C *45/24*

U.S. Cl. 260—586 R **15 Claims**

1. A process for the resolution of dl-allethrolone comprising reacting dl-allethrolone with an excess of succinic acid anhydride to form the hemisuccinate of dl-allethrolone, reacting the latter with ephedrine in an appropriate organic solvent selected from the group consisting of aromatic hydrocarbon, lower alkyl esters of lower alkanoic acids, lower aliphatic nitriles and lower aliphatic alcohols to form the ephedrine salt of the said hemisuccinate and crystallizing from the organic solvent a member selected from the group consisting of dextro ephedrine salt of the hemisuccinate of d-allethrolone and levo ephedrine salt of the hemisuccinate of l-allethrolone, reacting the recovered ephedrine salt with a dilute aqueous acid to form the resulting hemisuccinate and hydrolysing the latter by heating in an aqueous acid media to form the corresponding optical isomer of allethrolone.

4,005,147

PRODUCTION OF α,β-UNSATURATED KETONES

Roman Fischer, Ludwigshafen; Norbert Goetz, Bobenheim-Roxheim, and Herbert Mueller, Frankenthal, all of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany

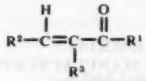
Filed Oct. 10, 1972, Ser. No. 295,959

Claims priority, application Germany, Oct. 13, 1971, 2150992

Int. Cl.² C07C *45/00*

U.S. Cl. 260—593 R **9 Claims**

1. A process for the production of at least α,β-unsaturated ketones of the formula (I):



(I)

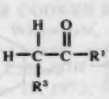
in which

R^1 and R^3 are branched or linear, saturated or unsaturated, aliphatic or cycloaliphatic-aliphatic hydrocarbon radicals of one to 20 carbon atoms or saturated or unsaturated cycloaliphatic hydrocarbon radicals of five to 20 carbon atoms which may also contain an alkyl group as a substituent and/or an endoalkylene group or an araliphatic hydrocarbon radical of seven to 15 carbon atoms or an aromatic hydrocarbon radical,

R^3 is hydrogen or an aliphatic hydrocarbon radical of one to 10 carbon atoms and moreover R^1 and R^3 together with the two adjacent carbon atoms may be common members of an alicyclic ring, by reaction of an aldehyde of the formula (II):

(II)

in which R^2 has the meanings given above with a ketone of the formula (III):



(III)

in which R^1 and R^3 have the meanings given above, in liquid phase wherein the reaction is carried out in the presence of a catalyst which consists essentially of zinc oxide.

4,005,148

DERIVATIVES OF PROPARGYL OR ALKENYL PHENYL ETHER AND USE THEREOF AS ACARICIDE

Yukio Aoki, Omiya; Shizuo Wakita; Shoichi Kato, both of Ageo, and Shuichi Ishida, Omiya, all of Japan, assignors to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan

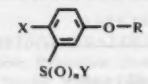
Filed Aug. 5, 1975, Ser. No. 602,069

Claims priority, application Japan, Aug. 9, 1974, 49-90760

Int. Cl.² C07C *147/14*

U.S. Cl. 260—607 AR **3 Claims**

1. A compound represented by the formula:



(I)

wherein X represents methyl group or chlorine atom, Y represents ethyl group, n-propyl group, or allyl group, R represents propargyl group, allyl group, buten-2-yl group, 3-methyl buten-2-yl group, 1-methylallyl group, 3-chloroallyl group, and *n* represents 0 or 1.

4,005,149

MERCAPTANS BY HYDROGEN SULFIDE-CLEAVAGE OF ORGANIC SULFIDES IN PRESENCE OF CARBON DISULFIDE

Donald H. Kubicek, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 1, 1975, Ser. No. 573,486

Int. Cl.² C07C *148/00*

U.S. Cl. 260—609 R **5 Claims**

1. In the preparation of mercaptans by catalytic cleavage of organic sulfides with hydrogen sulfide in the presence of a sulfactive catalyst a method for increasing the total conversion of reactants to mercaptans comprises conducting the reaction in the presence of carbon disulfide in a mole ratio of at most about 50/1 of organic sulfide/carbon disulfide and at a temperature and pressure sufficient for carrying out the reaction.

4,005,150

PHENYL ETHERS HAVING JUVENILE HORMONE ACTIVITY

František Šorm; Miroslav Svoboda; Jiří Žavada; Karel Slama, and Zdenek Arnold, all of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

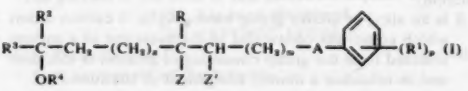
Filed May 18, 1971, Ser. No. 144,631

Claims priority, application Czechoslovakia, May 22, 1970, 3600-70; Nov. 27, 1970, 8032-70

Int. Cl.² C07C *43/20*

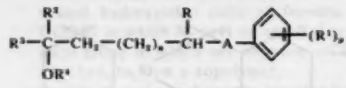
U.S. Cl. 260—613 D **13 Claims**

1. A compound selected from those of formulas I and II:



(I)

-continued



(II)

wherein, A is oxygen, R^1 is nitro or halo; each of R, R^2 and R^3 is lower alkyl; R^4 is hydrogen, lower alkyl, cycloalkyl or aralkyl; *m* is the positive integer one or two; *n* is the positive integer two or three; *p* is zero or the positive integer one to five; and each of Z and Z′ is hydrogen or together form a carbon-carbon bond.

4,005,151

PROCESS FOR PRODUCING POLYHALOGENATED PHENOLS

Masataka Wataya, Nagareyama; Nobuo Onodera, Hiratsuka, and Shosuke Imamura, Yokohama, all of Japan, assignors to Hodogaya Chemical Co., Ltd., Tokyo, Japan

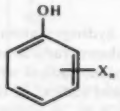
Filed Mar. 5, 1975, Ser. No. 555,627

Claims priority, application Japan, Mar. 7, 1974, 49-25755

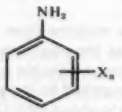
Int. Cl.² C07C *39/30, 39/32*

U.S. Cl. 260—623 R **10 Claims**

1. In a process for producing a polyhalogenated phenol represented by the formula,



wherein X is chlorine or bromine atom and *n* is 2 to 3, diazotizing a polyhalogenated aniline represented by the formula,



wherein X and *n* are as defined above to obtain a benzenediazonium salt and hydrolyzing the benzenediazonium salt to obtain the polyhalogenated phenol, the improvement which comprises mixing the polyhalogenated aniline with an aqueous sulfuric acid solution to obtain the polyhalogenated aniline sulfate, pulverizing the polyhalogenated aniline sulfate according to a wet pulverizing process to obtain a suspension of fine particles of the polyhalogenated aniline sulfate having a particle size of 2 to 50 microns, adding sodium nitrite to the polyhalogenated aniline sulfate suspension and effecting the diazotization of the polyhalogenated aniline sulfate at −10° C to +40° C, hydrolyzing the resulting polyhalogenated benzenediazonium sulfate by heating it as such at a temperature from 90° C to the apparent boiling temperature of the aqueous sulfuric acid and recycling to the diazotization step the aqueous sulfuric acid solution from which the desired polyhalogenated phenol has been separated.

4,005,152

CYCLOALKENYNES AND A METHOD FOR THE PREPARATION THEREOF

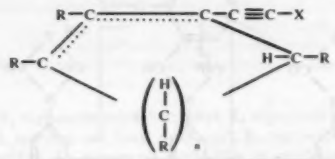
Louis Schmerling, Riverside, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Continuation-in-part of Ser. No. 428,635, Dec. 26, 1973, abandoned, which is a continuation-in-part of Ser. No. 196,792, Nov. 8, 1971, Pat. No. 3,799,997. This application Apr. 21, 1975, Ser. No. 569,899

Int. Cl.² C07C *23/08, 23/10, 23/14*

U.S. Cl. 260—648 R **6 Claims**

1. A compound possessing the generic formula:



in which R is independently selected from the group consisting of hydrogen and lower alkyl radicals, X is selected from the group consisting of chlorine and bromine radicals and *n* is an integer from 1 to 3, and wherein C C C denotes a double bond between the middle carbon atom and either of the other two carbon atoms and a single bond between the middle carbon atom and the remaining carbon atom.

4,005,153

POLYHALOCYCLOPENTENYL PHENYL COMPOUNDS

Samuel Gelfand, Niagara Falls, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Continuation of Ser. No. 381,846, July 23, 1973, which is a division of Ser. No. 142,054, May 10, 1971, Pat. No. 3,839,454, which is a continuation-in-part of Ser. No. 758,684, Sept. 10, 1968, which is a continuation-in-part of Ser. No. 318,522, Oct. 24, 1963, Pat. No. 3,450,768. This application June 9, 1975, Ser. No. 585,207

Int. Cl.² C07C *25/18*

U.S. Cl. 260—650 R **7 Claims**

1. A compound of the following formula:

wherein:

a. X is a halogen selected from the group consisting of chlorine and bromine;

b. Y is selected from the group consisting of chlorine, bromine, hydrogen and an alkyl radical of from 1 to 8 carbon atoms;

c. R is selected from the group consisting of chlorine, bromine, fluorine and trifluoromethyl;

d. Ar is a phenyl radical having R_n substituents and containing a hydrogen substituent on a ring position adjacent to the point of polyhalocyclopentadiene attachment; and

e. *n* is an integer from 2 to 4 and *q* is either 0 or 1.

4,005,154

CURING 1,2-EPOXY WITH PREPOLYMER BASED ON POLYAMINES AND OLIGOMERS POSSESSING IMIDE GROUPS

Michel Bargain, Lyon, France, assignor to Rhone-Poulenc S.A., Paris, France

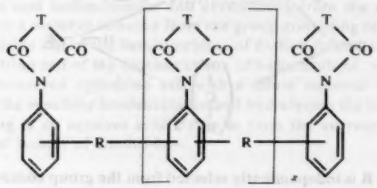
Continuation of Ser. No. 264,723, June 21, 1972, Pat. No. 3,883,486. This application Jan. 27, 1975, Ser. No. 544,571

Claims priority, application France, June 24, 1971, 71.23065

Int. Cl.² C08L *63/10, 63/00*

U.S. Cl. 260—837 R **24 Claims**

1. A process for curing a 1,2-epoxy resin which comprises mixing the epoxy resin with a curing amount of a prepolymer composition, said composition being prepared by heating (a) an oligomer having the average general formula:



(I)

in which *x* represents a number from 0.1 to about 2, R represents a divalent hydrocarbon radical with 1 to 8 carbon atoms, which is derived from an aldehyde or a ketone of the general formula:

(II)

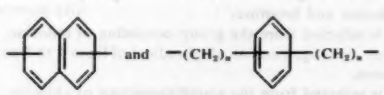
in which the oxygen atom is bonded to a carbon atom of the radical R, and T represents a divalent organic radical possessing 2 to 24 carbon atoms, the free valencies of which are on adjacent carbon atoms and which is derived from an internal anhydride of the general formula:

(III)

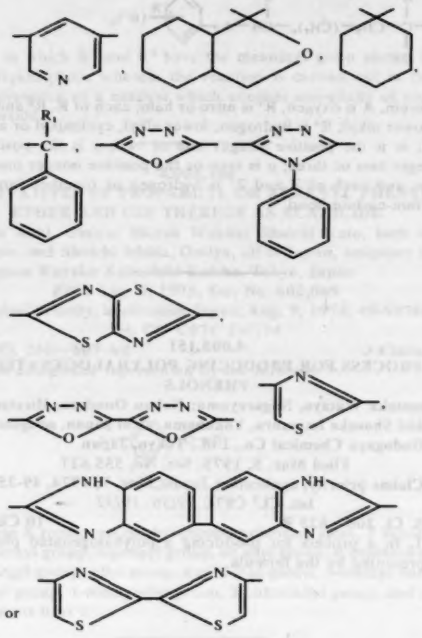
at least 60% of the T radicals in the oligomer containing a polymerisable carbon-carbon double bond, the remaining T radicals, if any, being alkylene, cycloalkylene, phenylene or naphthylene radicals with (b) a polyamine of the general formula:

in which *y* represents an integer at least equal to 2 and Q represents:

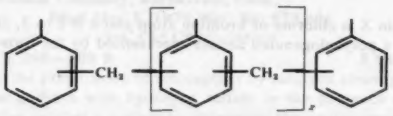
a divalent organic radical E selected from the group consisting of a linear or branched alkylene radical with less than 13 carbon atoms, a phenylene radical, a cyclohexylene radical, a phenylene radical substituted by a methyl radical, a cyclohexylene radical substituted by a methyl radical, radicals of the formulae:



wherein *n* represents an integer from 1 to 3, a radical consisting of a plurality of phenylene, cyclohexylene, phenylene substituted by methyl or cyclohexylene substituted by methyl, radicals connected to one another by a simple valency bond or by —O— or —S—, an alkylene group with 1 to 3 carbon atoms, —CO—, —SO_2—, —CONH—, —COO—, —P(O)R_1—, —CONH—X—NHCO—,



wherein R_1 represents a hydrogen atom, an alkyl radical with 1 to 4 carbon atoms, a phenyl radical or a cyclohexyl radical, and X represents an alkylene radical with less than 13 carbon atoms, and a 2- to 4-valent radical of the formula:



in which *x* represents a number from 0.1 to 2, the relative amounts being such that the oligomer supplies 1.1 to 50 T radicals containing a polymerisable carbon-carbon double bond per —NH_2 group supplied by the polyamine at a temperature from about 80° C. to about 200° C. until a homogeneous liquid or paste-like mixture is obtained, and the mixture of prepolymer and epoxy resin is then cured by subsequent heating at between 150° C. and 300° C.

4,005,155

POLYMERIC COMPOSITIONS

Keith George Sampson, Clophill; Victor Frederick Jenkins, St. Albans, and Anthony John Bunker, Kempston, all of England, assignors to Laporte Industries Limited, Luton, England

Division of Ser. No. 311,528, Dec. 4, 1972, abandoned. This application Feb. 5, 1975, Ser. No. 547,215

Claims priority, application United Kingdom, Dec. 9, 1971, 57175/71

Int. Cl.² C08L *61/26, 61/20, 33/08*

U.S. Cl. 260—851 **7 Claims**

1. A process for the preparation of a crosslinked modified

copolymer having the desirable combination of flexibility, hardness and chemical durability which comprises:

a. reacting together at least two ethylenically unsaturated monomers at least one of which is an ethylenically unsaturated hydroxyalkyl ester of formula $CH_2 = CR_1 - COOR_2$ in which R_1 is H or an alkyl group and R_2 is an alkyl group to which one or more $-CH_2OH$ groups are attached, to form a copolymer,

b. modifying said copolymer by reacting it with from 10% to 60% by weight of an epsilon caprolactone, and

c. crosslinking the modified copolymer of (b) with from 10% to 40% by weight of an amino resin selected from the group consisting of urea formaldehydes, melamine formaldehydes and benzoguamine formaldehydes.

4,005,156

NOVEL FLAME RETARDANT COMPOSITIONS OF MATTER

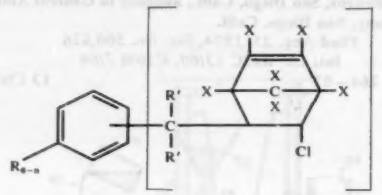
Louis Schmerling, Riverside, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Continuation-in-part of Ser. No. 397,197, Sept. 13, 1973, Pat. No. 3,892,815. This application Feb. 7, 1975, Ser. No. 548,503

Int. Cl.² C08K *5/03*

U.S. Cl. 260—880 R **9 Claims**

1. A novel flame retardant composition of matter comprising a polymer and a compound having the generic formula:



in which X is hydrogen, chlorine or bromine, at least two X's being chlorine or bromine, R' is selected from the group consisting of hydrogen and lower alkyl radicals, R is selected from the group consisting of hydrogen and lower alkyl radicals containing from 1 to about 4 carbon atoms and n is an integer of from 3 to about 6.

4,005,157

COATING COMPOSITIONS FOR METAL SUBSTRATES BASED ON ETHYLENE-TETRAFLUOROETHYLENE COPOLYMERS

Andrea Mattiussi, and Mario Modena, both of Bollate (Milan), Italy, assignors to Montecatini Edison S.p.A., Milan, Italy

Division of Ser. No. 373,163, June 25, 1973, Pat. No. 3,906,060. This application Apr. 7, 1975, Ser. No. 566,029

Claims priority, application Italy, June 28, 1972, 26325/72

Int. Cl.² C08F *29/22*; **C08L** *23/08*

U.S. Cl. 260—897 C **10 Claims**

1. A coating composition comprising an ethylene-tetrafluoroethylene copolymer mixture and at least one latent solvent, said ethylene-tetrafluoroethylene copolymer mixture being constituted by

a. 20–90% of at least one ethylene-tetrafluoroethylene copolymer having a melting point from about 250° C. to about 315° C. and containing between 52 and 58 mol % of chemically combined tetrafluoroethylene, and

b. 80–10% of at least one ethylene-tetrafluoroethylene copolymer having a melting point from about 180° C. to about 285° C. and containing 68 mol % of chemically combined tetrafluoroethylene.

4,005,158

O-(2-VINYLPHENYL)-THIOL-PHOSPHATES

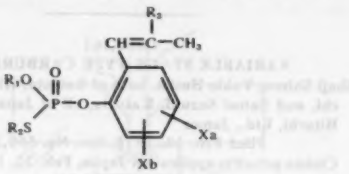
Manfred Böger, Haltingen, Germany, and Jozef Drabek, Allschwil, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 449,416, March 8, 1974, Pat. No. 3,898,306. This application May 27, 1975, Ser. No. 581,068

Int. Cl.² C07F *9/165*

U.S. Cl. 260—949 **7 Claims**

1. A compound of the formula



wherein R_1 represents methyl or ethyl; R_2 represents n-propyl, isopropyl, isobutyl, sec.butyl or n-amyl; R_3 represents hydrogen or methyl; Xa represents methylthio or methylsulphinyl; and Xb represents hydrogen when Xa is methylsulphinyl and represents hydrogen or methyl when Xa is methylthio.

4,005,159

HYDROXY CONTAINING PHOSPHONATES

Frederick William Koch, Willoughby Hills, and Jerry Lee Musser, Chardon, both of Ohio, assignors to The Lubrizol Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 403,373, Oct. 4, 1973, Pat. No. 3,932,290. This application Aug. 5, 1975, Ser. No. 602,036

Int. Cl.² C07F *9/40*

U.S. Cl. 260—953 **8 Claims**

1. A composition of matter prepared by reacting at least one phosphorus compound of the formula

wherein each of R^1 and R^2 is a lower alkyl-based radical, with at least one epoxide of the formula

wherein R^3 is an alkyl radical having 10–20 carbon atoms.

4,005,160

PREPARATION OF α-AMINO PHOSPHONIC ACID DERIVATIVES

Derek Redmore, Ballwin, and Neil E. S. Thompson, Creve Coeur, both of Mo., assignors to Petrolite Corporation, St. Louis, Mo.

Filed May 5, 1975, Ser. No. 574,262

Int. Cl.² C07F *9/40*

U.S. Cl. 260—970 **11 Claims**

1. A process of preparing an α-aminophosphonic acid derivative which comprises reacting a nitrile with a phosphite ester of the general formula

where R^2 and R^3 are alkyl, aryl, aralkyl or where R^2 and R^3 together form a ring structure in a ratio of nitrile to phosphite of about 1:1 to about 1:10 or more at a temperature from about 20° C. to about 150° C. and hydrogen pressures of about 40 to about 200 psi under hydrogenation conditions.

4,005,161

VARIABLE STAGE TYPE CARBURETOR

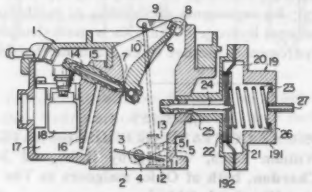
Shoji Shimo; Yukio Hosho, both of Katsuta; Hideo Usui, Hitachi, and Satosi Suzuki, Katsuta, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Feb. 18, 1975, Ser. No. 550,279

Claims priority, application Japan, Feb. 22, 1974, 49-20562

Int. Cl.² F02M *9/14*

U.S. Cl. 261—44 R **14 Claims**



8. A variable stage carburetor comprising

an intake passage,

venturi means including a movable venturi vane within said intake passage for defining a variable venturi portion with respect to said intake passage,

throttle valve means including a throttle valve disposed in said intake passage downstream of said venturi vane, and mounted for rotation on a fixed throttle valve shaft for varying opening of said throttle valve within said intake passage,

link means for interconnecting said venturi vane and said throttle valve to move said venturi vane commensurate with opening movement of said throttle valve to vary the venturi area of said venturi portion, and

vane-opening control means for controlling movement of said venturi vane independently of said throttle valve in response to changes of venturi negative pressure in said venturi portion, said control means forcedly displacing said venturi vane in a closing direction for increasing said venturi negative pressure when said throttle valve is in a substantially open position but the quantity of intake air is relatively small,

wherein said control means comprise first means for detecting variations in said negative pressure, and second means responsive to said first means for displacing said venturi vane in said closing direction when said negative pressure decreases.

4,005,162

PROCESS FOR THE CONTINUOUS PRODUCTION OF PARTICLE BOARD

Gunter Bucking, Springe, Deister, Germany, assignor to Bisonwerke Bahre & Greten GmbH & Co. KG, Germany

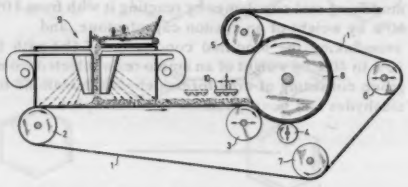
Filed Jan. 20, 1975, Ser. No. 542,292

Claims priority, application Germany, Jan. 18, 1974, 2402410; Apr. 22, 1974, 2419320

Int. Cl.² B29D *27/00*

U.S. Cl. 264—25 **7 Claims**

1. In a process for continuously producing particle board in which (a) wood cellulose-containing particles are mixed with a binding agent, (b) the mixture so obtained is spread onto an endless conveyor belt to form a layer having a high content of fines and dust of said wood cellulose-containing particles at least on an upper surface thereof, (c) the layer so formed is moved into a press at a speed causing at least some of the fines and dust on the upper surface of said layer to be blown away



from said layer, and (d) the layer is then compressed in said press under the influence of heat so that said binding agent is hardened and said particle board is thereby formed, the improvement wherein prior to entry of said layer into said press the upper surface of said layer is heated in such a manner that blowing off of fines and dust from said layer as said layer moves into said press is prevented.

4,005,163

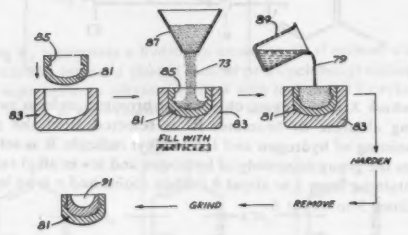
CARBON BEARINGS VIA VAPOR DEPOSITION

Jack C. Bokros, San Diego, Calif., assignor to General Atomic Company, San Diego, Calif.

Filed Aug. 23, 1974, Ser. No. 500,026

Int. Cl.² B29C *13/00*; C10M *7/04*

U.S. Cl. 264—81 **13 Claims**



1. A method of making a bearing or seal device comprising coating lubricating graphite substrate material with nongraphitic carbon at least about 25 microns thick by a vapor deposition process, and selectively removing said vapor-deposited carbon from a portion of said coated substrate to expose the underlying graphite and produce a strong, self-lubricating surface adapted for contact with a relatively movable object, said lubricating graphite constituting at least about one percent of said surface.

4,005,164

METHOD OF MAKING PLASTIC CONTAINERS

Brian Procter, Stroud, England, assignor to Hayssen Manufacturing Co., Sheboygan, Wis.

Continuation of Ser. No. 456,074, March 29, 1974, abandoned. This application July 28, 1975, Ser. No. 599,838

Claims priority, application United Kingdom, Apr. 10, 1973, 1727/73

Int. Cl.² B29C *7/00*

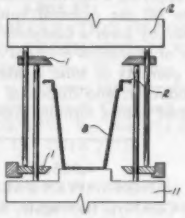
U.S. Cl. 264—97 **1 Claim**

1. The method of making plastic containers comprising:

A. molding a pre-form of thermoplastic material, said preform being adapted to be molded into a container, with a rim for the container molded as an integral part of the

pre-form, said pre-form being molded utilizing a transfer means having opposite sides, an aperture therethrough from one side to the other, and a groove formation surrounding the aperture adapted to receive thermoplastic material during the molding of the pre-form and defining the configuration for the rim of the container whereby the rim of the container is molded as an integral part of the pre-form, said pre-form being molded by

1. closing said aperture on both sides of the transfer means to define a closed space including said aperture and said groove formation for molding of the pre-form,
2. introducing into said space from one side of said transfer means a volume of thermoplastic material less than the volume of said space, said material flowing into said space through a passage on said one side of said transfer means,
3. closing said passage to close said space,
4. mechanically compressing the material within said space by applying pressure from the other side of said transfer means while maintaining said space closed to form said material into said pre-form with the material filling said groove formation thereby to mold the rim of the container which is to be formed from the pre-form as an integral part of of the pre-form, and also to retain the pre-form in the transfer means,



B. applying the transfer means carrying the pre-form to a mold having a cavity corresponding to the shape of the container,

C. forming the pre-form into a container in the mold cavity, and

D. separating the container and the transfer means without cutting the container and with the portion of the material molded in said groove formation intact with the container and constituting its rim;

E. the transfer means comprising two parts which are separable axially with respect to the container for separation from said two parts of said rim, one part being formed to form part of the groove formation for forming the top of the rim and the other part being formed to form part of the groove formation for forming the bottom of the rim,

E. said two parts of the transfer means being held together during said mechanical compression, and

G. the container being removed from said transfer means by axially separating said parts and relatively moving said one part away from the top of the rim and the other part away from the bottom of the rim and to a position wherein said parts are spaced a distance greater than the height of the container and the said other part is sufficiently clear of the bottom of the container to enable the container to be removed laterally between said parts.

4,005,165

METHOD FOR PRODUCING BOOKCOVERS

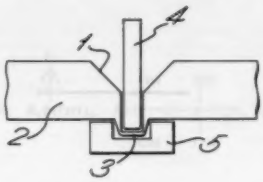
Charles Vivian Hawkes, Leatherhead, England, assignor to The Research Association for the Paper and Board Printing and Packaging Industries, Leatherhead, England

Filed July 9, 1975, Ser. No. 594,362

Claims priority, application United Kingdom, Feb. 17, 1975, 6584/75

Int. Cl.² B29D *31/00*

U.S. Cl. 264—135 **9 Claims**



1. A method of producing book covers, which method includes cutting at least one elongated notch along the length of one side of a sheet of comparatively semi-rigid plastics material having a tendency to return to its undeformed state after having been deformed by folding along the notched part of said sheet, and stretching the plastics defining the floor of the notch to alter its molecular structure so as to provide a readily foldable hinge, said stretching being effected by pressing the plastics defining the floor of the notch outwardly from the notch to raise a ridge on the other side of said sheet.

4,005,166

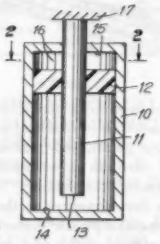
PROCESS OF MOLDING A CATHETER

James R. Quick, Warwick, N.Y., assignor to International Paper Company, New York, N.Y.

Filed May 27, 1975, Ser. No. 580,881

Int. Cl.² B29C *1/14*

U.S. Cl. 264—154 **9 Claims**



1. The process of manufacturing a catheter which comprises:

a. providing a mold with a first wire longitudinally disposed therein, said first wire having a widened cross-section at its proximal end;

b. providing a second wire spaced distally from said first wire and longitudinally aligned therewith;

c. positioning a follower about the first wire on close abutment with both the first wire and inside of the mold, said follower maintaining the first wire spaced from the inside wall of the mold so as to define an annular space between the first wire and the inside of the mold, said follower being initially positioned proximally of the distal end of the mold and distally of the widened cross-section of the wire;

d. introducing a molding material into said annular space

proximally of the proximal side of said follower under a pressure sufficient to distally displace said follower whereby molding material is molded around the widened and unwidened portions of the first wire;

e. continuing to introduce said molding material into said mold until said follower is displaced off said first wire and onto said second wire whereby there is formed a catheter including a drainage lumen, a funnel and a catheter tip;

f. stripping the resulting catheter from the first wire; and

g. providing at least one hole at the distal end of the catheter in communication with said drainage lumen.

4,005,167

PLASTICIZING APPARATUS

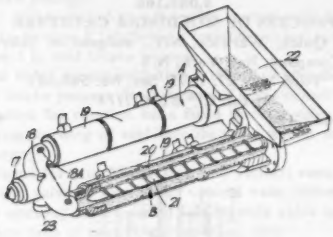
David Stern, Windsor, England, assignor to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 98,457, Dec. 15, 1970, abandoned, which is a division of Ser. No. 747,297, July 24, 1968, abandoned. This application Jan. 2, 1973, Ser. No. 320,286

Claims priority, application United Kingdom, July 28, 1967, 34896/67

Int. Cl.² B29F 1/12

U.S. Cl. 264—329 **3 Claims**



1. In a process for moulding plastic materials by providing plasticised plastic materials in first and second separate chambers and forcing the plasticised plastic materials from the separate chambers through a common outlet and into a mould, the improvement comprising:

1. connecting the first chamber to the common outlet and forcing the plasticised plastic material from that chamber through the common outlet and into the mould to partially fill the mould;

2. while continuing to force plasticised plastic material from the first chamber, connecting the second chamber to the common outlet and forcing the plasticised plastic materials from both chambers through the common outlet into the mould;

3. discontinuing the forcing of plasticised plastic material from the first chamber by disconnecting that chamber from the common outlet and continuing to force plasticised plastic material from the second chamber through the common outlet into the mould to further fill the mould; and

4. discontinuing the forcing of plasticised plastic material from the second chamber by disconnecting that chamber from the common outlet after the desired amount of plasticised plastic material from the second chamber has been forced into the mould.

4,005,168

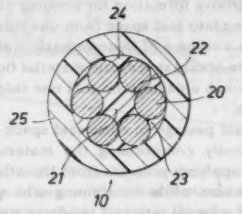
METHOD FOR MAKING A GAS BLOCKED LOGGING CABLE

William A. Whitfill, Jr., and Richard P. McNerney, both of Houston, Tex., assignors to Schlumberger Technology Corporation, New York, N.Y.

Division of Ser. No. 302,159, Oct. 30, 1972, Pat. No. 3,800,066. This application June 13, 1973, Ser. No. 369,665

Int. Cl.² H01B 7/24, 7/02

U.S. Cl. 264—103 **3 Claims**



1. A process for making a gas blocked electrical cable, comprising the steps of: twisting a plurality of conductive wire strands around a thermoplastic monofilament; embedding said strands at least partially in the outer surface of said monofilament to eliminate internal void spaces between strands; said embedding step being performed by heating said conductor while applying tension thereto to soften said monofilament and force said strands at least partially into the external surfaces thereof; applying a thermoplastic filler material around said strands to fill the external void spaces between said strands and thereby form a completely filled conductor; extruding a layer of insulation material over said filled conductor; cabling a plurality of solid insulated conductors around said filled conductor; and disposing all of said conductors within a void-free matrix forming material.

4,005,169

NON-WOVEN FABRICS

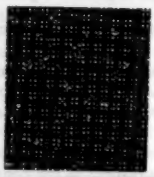
David Charles Cumbers, Harrogate, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Apr. 17, 1975, Ser. No. 568,837

Claims priority, application United Kingdom, Apr. 26, 1974, 18326/74

Int. Cl.² B29D 3/02

U.S. Cl. 264—103 **14 Claims**



1. In a method of making a thermally segmentally bonded non woven fabric comprising compressing a fibrous web containing distributed thermally bondable material between two members whose opposed co-operating surfaces each have different surface land patterns heated sufficiently to activate the thermally bondable material in contact with them, the improvement comprising using regular patterns of lands which are isolated discontinuous projections spaced-apart on all sides from adjacent projections opposed pairs of lands, one on each member, differing from at least some other such pairs in their degrees of relative register in two directions at right angles the differences in register between different opposed pairs of lands ranging in each direction from zero to half of the

corresponding interland spacings whereby uncontrolled variations in register between the members as a whole cause no visible difference in the segmental bond pattern in the resultant fabric and no intermeshing can occur between the members.

4,005,170

PREPARATION OF PELLETIZED CARBON BLACKS

Howard R. Harris, Morgan City, La., assignor to Cabot Corporation, Boston, Mass.

Continuation of Ser. No. 397,236, Sept. 14, 1973, abandoned, which is a continuation-in-part of Ser. No. 199,030, Nov. 15, 1971, abandoned. This application Oct. 16, 1975, Ser. No. 622,981

Int. Cl.² B01J 2/12

U.S. Cl. 264—117 **4 Claims**

1. In a process for wet pelletizing carbon black wherein fluffy carbon black is agitated in a pelletizer in the presence of sufficient pelletizing liquid to agglomerate the particles of carbon black into free-flowing pellets, the improvement comprising:

a. intimately admixing said fluffy carbon black with a portion of about 3 to about 75% of said pelletizing liquid in a mixer having rotational means operating at a speed in excess of 550 r.p.m., and

b. agitating the resulting wet mixed carbon black with the remaining portion of said pelletizing liquid to agglomerate said carbon black into said free-flowing pellets.

4,005,171

CATALYTIC PREPARATION OF SOLUBLE POLY(DICHLOROPHOSPHAZENES)

Kennard A. Reynard, and Arthur H. Gerber, both of Cleveland, Ohio, assignors to Horizons Incorporated, a division of Horizons Research Incorporated, Cleveland, Ohio

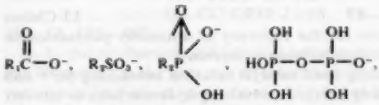
Filed May 28, 1974, Ser. No. 474,055

Int. Cl.² C01B 25/10

U.S. Cl. 423—300 **9 Claims**

1. A process for the preparation of soluble polyhalophosphazene polymer consisting essentially of recurring structural units represented by the formula $[X_2PN]$ and having an intrinsic viscosity of about 0.01 to about 3.0 dl/g (benzene, 30° C), said polymer being soluble in benzene, toluene, chlorobenzene, and dichlorobenzene, which comprises heating at least one cyclic oligomer represented by the formula $(X_2PN)_m$ where m is 3–7, wherein X is a halogen selected from the group consisting of F, Cl, and Br and all of the X's are not required to be identical, at temperatures of about 130° C to 220° C in the presence of an effective amount of at least one catalyst which is selected from the group consisting of A and B and mixtures thereof wherein:

Group A consists of metallic or quaternary ammonium salts in which the anion is represented by one of the following formulae:

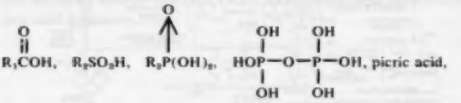


$(O_2N)_2C_6H_2O^-$, and $H_2PO_4^-$.

where R_1 is a monovalent member selected from the group consisting of polyhaloalkyl, where the halogen is F, Cl or mixtures thereof, perfluoroaryl and perchloroaryl; R_2 is a monovalent member selected from the group consisting of F, Cl, lower alkyl (C_1–C_3), aryl, substituted alkyl and substituted aryl with the proviso that R_2 is not halogen when bonded to

and the metal of the salt is a metal selected from the group consisting of Li, Na, K, Mg, Ba, Hg, Ag, Mn and Zn;

Group B consists of at least one acid selected from the group consisting of acids represented by the following formulae:



H_3PO_4 and its dehydrated derivatives and wherein R_1 and R_2 are as defined in Group A.

4,005,172

SOLID COMPLEX PHOSPHATE OF ALUMINUM

James Derek Birchall, and John Edward Cassidy, both of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 274,964, July 25, 1972, Pat. No. 3,870,737, and a continuation of Ser. No. 42,499, June 1, 1970, abandoned. This application Oct. 21, 1974, Ser. No. 516,778

Claims priority, application United Kingdom, June 12, 1969, 29862/69

Int. Cl.² C01B 25/10

U.S. Cl. 423—300 **7 Claims**

1. A solid water-soluble inorganic halogen-containing complex phosphate of aluminum wherein the ratio of the number of gram atoms of aluminum to the number of gram atoms of phosphorus is substantially 1:1, the ratio of the number of gram atoms of aluminum to the number of gram atoms of halogen is substantially 1:1, and which contains at least one chemically-bound molecule of water.

4,005,173

STEAM STRIPPING OF AMMONIACAL SOLUTIONS AND SIMULTANEOUS LOADING OF METAL VALUES BY ORGANIC ACIDS

J. Paul Pemsler, Lexington, and John K. Litchfield, Bedford, both of Mass., assignors to Kennecott Copper Corporation, New York, N.Y.

Filed Mar. 3, 1975, Ser. No. 554,416

Int. Cl.² C01G 3/00, 51/00, 53/00

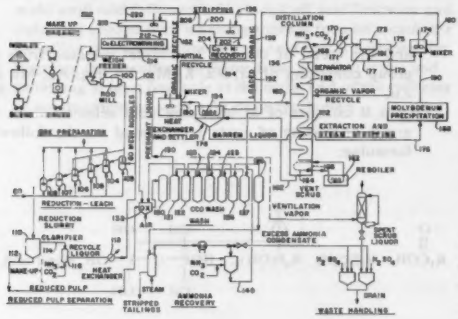
U.S. Cl. 423—24 **18 Claims**

10. In a process of the type in which metal values selected from the group of copper, nickel, cobalt, molybdenum and mixtures thereof are recovered from a manganese containing ore by introducing the ore into a reaction vessel containing a basic aqueous ammoniacal leach liquor having a pH above 9 and containing ammonia, carbon dioxide and cuprous ions and in which the cuprous ions reduce the manganese oxides in the ore to enable the metal values to be solubilized and in which cuprous ions are continuously regenerated by a reducing gas wherein the improvement comprises:

a. adding an organic acid ion extractant to the aqueous ammoniacal leach liquor containing solubilized copper, nickel, cobalt and molybdenum;

b. thereafter driving off a sufficient amount of ammonia and carbon dioxide from said aqueous ammoniacal leach liquor to lower the pH of said aqueous ammoniacal leach

liquor to a level where the organic acid is insoluble in said aqueous ammoniacal leach liquor and is capable of extracting metal values therefrom;



c. separating the loaded organic acid from the aqueous ammoniacal leach liquor; and,

d. selectively stripping metal values from the loaded acid.

4,005,174

PROCESS FOR THE ELIMINATION OF CHLORIDE FROM ZINC SULPHATE SOLUTIONS

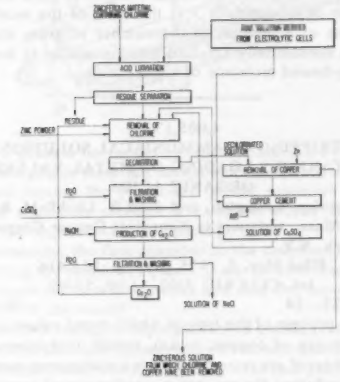
Fernand Jacques Joseph Bodson, 35, Quai Saint Paul de Sincay, B.4900 Angleur, Belgium

Filed June 17, 1975, Ser. No. 587,629

Claims priority, application Belgium, June 17, 1974, 816468

Int. Cl.² C01G *3/04*

U.S. Cl. 423—43 **9 Claims**



1. A cyclic process for removing chloride ions from a sulfuric acid solution of zinc sulphate, wherein the pH of said solution is below 2.6 and the cupric ion content of said solution is at such a value that after removal of the chlorine by precipitation as cuprous chloride, as hereinafter recited, the cupric ion concentration of said solution is at least 0.5 g/l, said process comprising adding cuprous oxide to said solution in an amount which is at least equal to the stoichiometrical amount needed for the formation of a cuprous chloride precipitate with the chloride ions present in the solution, separating the cuprous chloride precipitate from the solution and converting the cuprous chloride to cuprous oxide which is used again.

4,005,175

PROCESS FOR THE JOINT PRODUCTION OF SODIUM TRIPOLYPHOSPHATE AND TITANIUM DIOXIDE

Benedetto Calcagno; Luigi Piccolo; Antonio Paolinelli; Giorgio Cozza, all of Milan, and Gabriele Bottai, Varese, all of Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed Mar. 21, 1975, Ser. No. 560,750

Claims priority, application Italy, Mar. 25, 1974, 67939/74

Int. Cl.² C01G *23/04*; C01B *25/30*

U.S. Cl. 423—83 **7 Claims**

1. A process for the joint production of titanium dioxide and sodium tripolyphosphate from ores of titanium and phosphorous and from sulphuric acid comprising:

a. contacting, at an elevated temperature, ilmenite or titanium bearing slags with concentrated sulphuric acid to form a solid product which is subsequently dissolved in water or weak acid to yield a solution containing titanium sulphates and iron sulphates;

b. converting entirely said iron sulphates to their reduced, ferrous form by reducing the ferric iron present to ferrous iron, and clarifying the resulting solution;

c. separating the ferrous sulphate in the form of ferrous sulphate heptahydrate;

d. subjecting the remaining solution from which the ferrous sulphate heptahydrate has been separated to hydrolysis so that the titanium dioxide is precipitated in hydrated form, leaving an aqueous solution of sulphuric acid;

e. converting said precipitated hydrated titanium dioxide to pigments of rutile or anatase;

f. concentrating said aqueous solution of sulphuric acid resulting from the separation of hydrated titanium dioxide to a concentration of between 40% and 70% by weight of free acid;

g. contacting the concentrated solution of sulphuric acid at an elevated temperature with phosphatic ores, the quantity of concentrated solution of sulphuric acid being in excess of the stoichiometric quantity necessary to liberate phosphoric acid from said ores;

h. separating the fluorine and silicon from the solution resulting from the acid attack of the phosphatic ores and purifying the solution from sulphate ions, free sulphuric acid, arsenic and organic substances present;

i. separating vanadium, chronium and iron by the addition of sodium hydroxide in an amount sufficient also to cause salification of the phosphoric acid; and

j. converting sodium phosphates thus-produced to sodium tripolyphosphate.

4,005,176

PROCESS FOR THE RECOVERY OF ANTIMONY PENTACHLORIDE FROM USED CATALYST SOLUTIONS

Gunter Fernschild; Werner Rudolph, and Joachim Massonne, all of Hannover, Germany, assignors to Kali-Chemie Aktiengesellschaft, Hannover, Germany

Filed Aug. 14, 1975, Ser. No. 604,540

Claims priority, application Germany, Aug. 17, 1974, 2439540

Int. Cl.² C01B *9/00*

U.S. Cl. 423—87 **13 Claims**

1. A process for the recovery of antimony pentachloride from used catalyst solution comprising:

a. chlorinating used catalyst solution containing Sb^{3+} and high boiling halogen-containing hydrocarbons to convert said Sb^{3+} to Sb^{5+};

b. reacting said solution with hydrogen fluoride to give $SbCl_xF_y$ wherein x is 4–2 and y is 1–3, the sum of x and y being 5, and fluorinated lower boiling hydrocarbons;

c. removing said fluorinated lower boiling hydrocarbons having lower boiling temperatures than said $SbCl_xF_y$ compounds from said solution by distillation;

d. reacting said $SbCl_xF_y$ compounds with carbon tetrachloride to $SbCl_5$; and

e. separating said $SbCl_5$ from said solution by distillation.

4,005,177

CATALYTIC TREATMENT OF AUTOMOTIVE EXHAUST GAS

Guenther Weidenbach, Anderten; Karl Hermann Koepernik, Hannover, and Hans Braeutigam, Grossburgwedel, all of Germany, assignors to Kali-Chemie Aktiengesellschaft, Hannover, Germany

Filed Jan. 17, 1975, Ser. No. 541,775

Claims priority, application Germany, Jan. 19, 1974, 2402519

Int. Cl.² B01D *53/34*

U.S. Cl. 423—213.5 13 Claims

1. In a process for removing harmful components from automobile exhaust gas or industrial waste gas containing nitrogen oxides (NO_x), carbon monoxide (CO) and unburned hydrocarbons, including the steps of oxidizing said CO and said hydrocarbons and/or reducing of said NO_x by contacting said gas at an elevated temperature between about 200° and 1000° C. with a catalyst wherein the improvement comprises said catalyst comprising a solid catalytically active carrier material consisting essentially of aluminum oxide and having admixed therewith between about 0.2 and 15% by weight of zinc oxide, said zinc oxide having been incorporated in said aluminum oxide as preformed zinc oxide, and carried upon said carrier, a catalytically active metal component consisting essentially of at least one noble metal, whereby said process can be carried out over extended periods of time at said elevated temperatures without said catalyst losing its activity and therefore requiring replacement.

4,005,178

METHOD FOR CONVERTING UF5 TO UF4 IN A MOLTEN FLUORIDE SALT

Melvin R. Bennett; Carlos E. Bamberger, and A. Donald Kelmers, all of Oak Ridge, Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed July 10, 1975, Ser. No. 594,823

Int. Cl.² C01G *43/06;* B01J *23/42, 23/52*

U.S. Cl. 423—259 4 Claims

1. A method of reducing UF_5 to UF_4 in a molten fluoride salt comprising reacting said salt with hydrogen in the presence of an effective catalytic amount of platinum.

4,005,179

WORKING UP SYNTHESIS SOLUTIONS OBTAINED IN PRODUCTION OF HYDRAZINE

Kurt-Wilhelm Eichenhofer, Leverkusen; Reinhard Schliebs, Cologne, both of Germany; Hermann Brandl, Baytown, Tex., and Heinrich Kohnen, Leverkusen Schlebusch, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed July 18, 1975, Ser. No. 597,263

Claims priority, application Germany, July 27, 1974, 2436335

Int. Cl.² C01B *21/16*

U.S. Cl. 423—407 24 Claims

1. In the production of hydrazine wherein aqueous ammonia is oxidized in the presence of a ketone to form an aqueous solution containing at least one of a hydrazone and a ketazine along with ammonia, the hydrazone and ketazine are concentrated and the hydrazone and ketazine are subsequently hydrolyzed to hydrazine and ketone, the improvement which comprises effecting the concentration of the hydrazone and ketazine by extracting the aqueous solution with a substantially water-immiscible higher alcohol with 5 to about 18 carbon atoms whereby the hydrazone and ketazine preferentially enter the water-immiscible higher alcohol, and separating the water-immiscible higher alcohol extract from the aqueous solution.

4,005,180

METHOD FOR PRODUCING SYNTHETIC DIAMONDS

Geoffrey Harvey Greenhalgh, Sussex, England; Roger John Wedlake, and Pieter Willem Gideon DeJager, both of Johannesburg, both of South Africa, assignors to De Beers Industrial Diamond Division Limited, South Africa

Continuation of Ser. No. 286,678, Sept. 6, 1972, abandoned. This application Jan. 24, 1975, Ser. No. 543,871

Int. Cl.² B01J *3/06;* C01B *31/06*

U.S. Cl. 423—446 1 Claim

1. A method of producing diamond including the step of subjecting a compound selected from the group consisting of hexachlorobenzene, hexachloroethane and tetrachloroquinone, to a temperature of 300° to 1150° C. and a pressure of 25 to 50 kilobars, said temperature and pressure being below the Berman-Simon line, for 15 to 30 minutes, and then releasing said pressure.

4,005,181

METHOD TO MAKE CARBON BLACK UTILIZING POLYMERS

George R. Hill, Houston, Tex., and Homer M. Fox, Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 324,393, Jan. 17, 1973, Pat. No. 3,903,249, which is a continuation-in-part of Ser. No. 841,567, July 14, 1969, abandoned. This application June 23, 1975, Ser. No. 589,509

The portion of the term of this patent subsequent to Sept. 2, 1992, has been disclaimed.

Int. Cl.² C09C *1/48, 1/50*

U.S. Cl. 423—449 3 Claims

1. A process for producing carbon black by the pyrolytic decomposition of hydrocarbon feedstock comprising:

a. introducing a hydrocarbon feedstock selected from the group of liquid and gaseous hydrocarbons into a carbon black reactor;

b. combusting a normally liquid fuel having dissolved therein a normally solid polymer selected from the group consisting of polyethylene, polypropylene, polyvinyl chloride and polystyrene and mixtures thereof with a gaseous oxidant selected from the group consisting of air, oxygen-enriched air, and oxygen to produce hot combustion gases,

c. contacting the hydrocarbon feedstock in the carbon black reactor with the hot combustion gases;

d. pyrolytically decomposing said feedstock in the heat created by the combustion of step (b), such as to convert said feedstock into a carbon black-containing smoke;

e. separating said carbon black from said smoke; and

f. recovering said carbon black.

4,005,182

STABLE SODIUM SULFATE-HYDROGEN PEROXIDE-SODIUM CHLORIDE ADDUCT AND PROCESS FOR PREPARING SAME

Yoshio Ito, and Toshio Mashiko, both of Kohriyama, Japan, assignors to Kao Soap Co., Ltd. and Nippon Peroxide Co., Ltd., both of Tokyo, Japan

Filed July 7, 1975, Ser. No. 593,202

Int. Cl.² C01B *17/46, 17/98, 15/00;* C11D *3/395*

U.S. Cl. 423—467 5 Claims

1. An adduct having the formula: $4Na_2SO_4 \cdot 2H_2O_2 \cdot NaCl$.

4,005,183
HIGH MODULUS, HIGH STRENGTH CARBON FIBERS PRODUCED FROM MESOPHASE PITCH

Leonard Sidney Singer, Berea, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

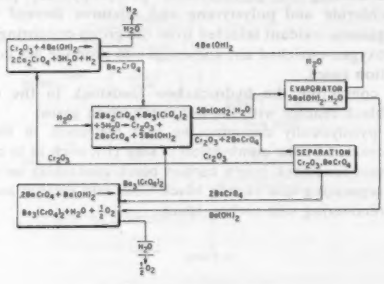
Continuation-in-part of Ser. No. 239,490, March 30, 1972, abandoned. This application Mar. 5, 1973, Ser. No. 338,147
Int. Cl.² C01B *31/07*
U.S. Cl. 423—447.2 **35 Claims**

1. A fiber having a structure possessing the three-dimensional order characteristic of polycrystalline graphite, said fiber having a diameter no greater than 30 microns; an electrical resistivity less than 250×10^{-6} ohm centimeters; a tensile strength greater than 200×10^3 psi.; a Young's modulus of elasticity greater than 50×10^6 psi.; an X-ray diffraction pattern characterized by the presence of the (112) cross-lattice line, and resolved (100) and (101) lines; a preferred orientation of carbon crystallites parallel to the fiber axis such that the preferred orientation parameter for the fiber is no greater than 10° (determined by microdensitometer scanning of the (002) band of the exposed X-ray film of the fiber and expressed as the full width at half maximum of the azimuthal intensity distribution); an interlayer spacing *d* no greater than 3.37 A; and containing oriented elongated domains preferentially aligned parallel to the fiber axis, said domains characteristically being greater than 5000 A in diameter and visible under polarized light at a magnification of 1000 X.

4,005,184
THERMOCHEMICAL PROCESS FOR THE PRODUCTION OF HYDROGEN USING CHROMIUM AND BARIUM COMPOUND

Carlos E. Bamberger, and Donald M. Richardson, both of Oak Ridge, Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed July 24, 1975, Ser. No. 598,918
The portion of the term of this patent subsequent to Dec. 16, 1992, has been disclaimed.
Int. Cl.² C01B *13/02*
U.S. Cl. 423—579 **4 Claims**



1. A cyclic process for splitting water into hydrogen and oxygen, comprising the steps of:

reacting (1) chromium oxide with barium hydroxide to produce hydrogen, water and Ba_2CrO_4 as reaction products;

separating hydrogen and water from the reaction environment;

reacting (2) said Ba_2CrO_4 with $Ba_3(CrO_4)_2$ and water to form said chromium oxide, $BaCrO_4$ and barium hydroxide;

reusing a part of said barium hydroxide and said chromium oxide in said first mentioned step of reacting;

reacting (3) the remainder of said barium hydroxide with said $BaCrO_4$ to produce said $Ba_3(CrO_4)_2$, water and oxygen;

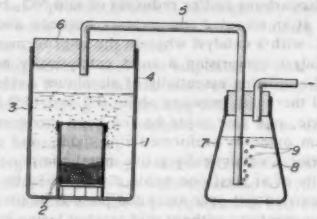
separating said water and oxygen from the reaction environment; and

reusing said $Ba_3(CrO_4)_2$ in said second mentioned step of reacting.

4,005,185
METHOD FOR HYDROGEN GENERATION

Otaharu Ishizaka, c/o Tohwa-mansion No. 1303, 12-12 Hohman 2-chome, Suginami, Tokyo, Japan

Filed Apr. 10, 1974, Ser. No. 459,723
Int. Cl.² C01B *1/02, 1/07;* C01C *1/00;* C01B *21/00*
U.S. Cl. 423—648 **9 Claims**



1. A method for generating hydrogen comprising contacting

a. metallic zinc with

b. an ammonium-complex salt of a metal other than zinc in an aqueous solution maintained under alkaline conditions of a member selected from the group consisting of:

i. neutral ammonium carbonate ($(NH_4)_2CO_3$),

ii. neutral ammonium carbonate and an ammonium salt of an inorganic acid,

iii. an ammonium salt of an inorganic acid and ammonia water, and

iv. neutral ammonium carbonate, an ammonium salt of an inorganic acid and ammonia water

and at a reaction temperature of from about 10° to 40° C, whereby hydrogen is generated through the transformation of the ammonium salt of the metal other than zinc into an ammine coordinated complex salt of the metal other than zinc.

4,005,186
METHODS OF INCREASING CATALYTIC ACTIVITY

Peter J. Ficalora, R.D. No. 1, Tully, N.Y. 13159, and Geoffrey Hao-Wen Liu, 106 Cherry Hill, Dewitt, N.Y. 13214

Continuation-in-part of Ser. No. 459,460, April 10, 1974, abandoned. This application Dec. 29, 1975, Ser. No. 644,629
Int. Cl.² B01J *23/74, 35/02;* C01G *49/00*
U.S. Cl. 423—659 **7 Claims**

1. A method of performing a catalytic chemical reaction comprising:

a. attaching a solid body of a catalyst of the type wherein catalysis occurs at the site of surface defects to a base support material which may be physically deformed by the application of at least one of an electrical and magnetic field, said catalyst and base support being attached over mutually opposing surfaces, whereby physical distortion of said base at said opposing surface is thereof transmitted to said catalyst;

b. placing said base support with said catalyst attached within a reaction vessel;

c. applying said field to said base support to a degree sufficient to deform said base to an extent creating plastic deformation defects in an exposed surface of said catalyst;

d. introducing into said reaction vessel the materials to be reacted for contact with said exposed surface; and

e. withdrawing the products of the reaction from said vessel.

4,005,187

DIAGNOSTIC TEST METHOD

Gustave F. Kilthau, and Diana R. Loftin, both of Houston, Tex., assignors to Data Diagnostic Corporation, Houston, Tex.

Filed June 3, 1974, Ser. No. 475,797
Int. Cl.² G01N *33/00*; G01T *1/16*; G21H *5/02*
U.S. Cl. 424—1.5 52 Claims

1. A method of isolating a diagnostically significant component in a test fluid mixture comprising contacting at least 2 solutes in said test fluid mixture, which solutes react to form in situ a solid absorbent, said solid absorbent formed of material other than said diagnostically significant component and being of a nature so as to selectively adsorb at least a portion of said diagnostically significant component.

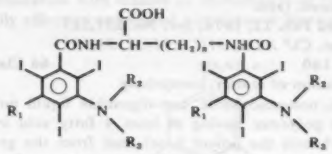
4,005,188

X-RAY CONTRAST MEDIA

Guy Tilly; Michel Jean Charles Hardouin, and Jean Lautrou, all of Aulnay-sous-Bois, France, assignors to Laboratoires Andre Guerbet, Aulnay-sous-Bois, France

Filed May 20, 1975, Ser. No. 579,280
Claims priority, application United Kingdom, May 31, 1974, 24169/74
Int. Cl.² A61K *29/02*; C07C *65/20*, *65/22*
U.S. Cl. 424—5 5 Claims

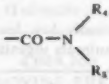
1. Compounds of the formula :



I

in which:

R_1 is selected from the group consisting of hydrogen and a radical of the formula



in which R_4 and R_5, independently of each other, are selected from the group consisting of hydrogen and a lower alkyl radical,

R_2 is selected from the group consisting of hydrogen and a lower alkanoyl radical,

R_3 is selected from the group consisting of hydrogen, a lower alkyl radical and a lower alkanoyl radical, n is 3 or 4,

and their lower alkyl esters and their salts with pharmaceutically acceptable bases.

4,005,189

PROCESS OF SUPPRESSING ODORS EMPLOYING DEODORANTS CONTAINING ESTERS OF ALIPHATIC HYDROXYCARBOXYLIC ACIDS

Gunter Reese, Dusseldorf-Holthausen, and Rainer Osberghaus, Dusseldorf-Urdenbach, both of Germany, assignors to Henkel & Cie G.m.b.H., Dusseldorf-Holthausen, Germany

Filed Apr. 2, 1975, Ser. No. 564,554
Claims priority, application Germany, Apr. 16, 1974, 2418362
Int. Cl.² A61K *7/32*
U.S. Cl. 424—47 5 Claims

1. A process for suppressing body odor in a warmblooded animal comprising applying topically to said warmblooded animal an effective deodorizing amount of a substantially anhydrous cosmetic preparation containing from 1% to 25% by weight based upon the total weight of at least one ester of an aliphatic acid having from 2 to 4 carbon atoms selected from the group consisting of a hydroxyalkanoic acid, a dihydroxyalkanoic acid, a hydroxyalkanedioic acid and a dihydroxyalkanedioic acid with an alcohol selected from the group consisting of an alkanol having from 1 to 6 carbon atoms, a cycloalkanol having from 5 to 6 carbon atoms and an alkanepolyol having 2 to 6 carbon atoms and 2 to 6 hydroxy groups; and the remainder of inert cosmetic ingredients.

4,005,190

INFUSION SOLUTION FOR PARENTERAL FEEDING

Helmut Mader, Furth; Werner Feki, Erlangen, and Klaus Schultis, Frankfurt, all of Germany, assignors to J. Pfrimmer & Co., Erlangen, Germany

Filed Apr. 2, 1975, Ser. No. 564,453
Claims priority, application Germany, July 10, 1974, 2433173
Int. Cl.² A61K *33/00*
U.S. Cl. 424—127 1 Claim

1. In an infusion solution for parenteral feeding which comprises water-soluble amino acids, polyols, minerals and vitamins and water-insoluble components comprising phosphatides or phosphatides and vitamins A, E, D and K, the improvement which comprises including in the infusion solution an amount sufficient to solubilize the water-insoluble components of a solubilizing mixture of ethanol and at least one member selected from the group consisting of 3α, 12α-dihydroxy-5β-cholanic acid and 3α, 7α, 12α-trihydroxy-5β-cholanic acid or their salts, the said cholanic acid compounds or their salts being present in the infusion solution in an amount sufficient to yield a weight ratio of water-insoluble phosphatides to cholanic acid compounds or their salts of from about 1:1 to 3:1, whereby the infusion solution is maintained in clear solution.

4,005,191

TOPICAL OINTMENT COMPOSITION

Mary G. Clark, 121 W. Grace St., Old Forge, Pa. 18518

Continuation of Ser. No. 476,294, June 4, 1974, abandoned. This application Nov. 5, 1975, Ser. No. 628,972
Int. Cl.² A61K *33/06*
U.S. Cl. 424—154 13 Claims

1. A topical ointment composition consisting essentially of an admixture of:

a. a mixture of non-systemic bases consisting of from about 7 to about 82 weight percent calcium carbonate, from about 5 to about 77 weight percent magnesium hydroxide and from about 6 to about 80 weight percent aluminum hydroxide, with the proviso that the percentages of said components in said mixture total 100% thereof; and

b. a mixture of carrier materials consisting essentially of anhydrous lanolin and hydrophilic ointment said carrier materials being present in said carrier mixture in a weight ratio of approximately 2:1 to 1:2; said ointment containing a weight ratio of said mixture of 1:21 to 1 to 213, effective to promote growth of normal healthy body tissues.

4,005,192

COMPOSITION IN SUBSTANTIALLY RIGID BLOCK FORM FOR CONTROLLING OR PREVENTING BLOAT IN ANIMALS

Clifford Arthur Andrew Graham, Nunawading, and Kevin Lawrence Linehan, Burwood East, both of Australia, assignors to ICI Australia Limited, Melbourne, Australia

Filed July 17, 1974, Ser. No. 489,437
Claims priority, application Australia, July 27, 1973, 4265/73
Int. Cl.² A61K 33/08, 31/70, 31/08
U.S. Cl. 424—157 5 Claims

1. A therapeutic composition of matter in the form of a substantially rigid block for use in controlling or preventing bloat in animals, said composition comprising an effective amount of the reaction product obtained by mixing together at a temperature not in excess of 90° C molasses, magnesium oxide, and a nonionic polyoxyalkylene surface active compound and maintaining the resultant mixture at a temperature not in excess of 90° C until the evolution of self-generated heat from the mixture has ceased substantially and the mixture has been converted to a substantially rigid form, the surface active compound being one of formula

$$R^1 - O \left\{ CH_2CH_2 - O \right\}_n H$$

wherein R^1 is a linear C_{9-18} alkyl group and n lies in the range 10 to 30 inclusive.

4,005,193

MICROBIOCIDAL POLYMERIC QUATERNARY AMMONIUM COMPOUNDS

Harold A. Green, Havertown, Pa.; John J. Merianos, Jersey City, and Alfonso N. Petrocci, Glen Rock, both of N.J., assignors to Millmaster Onyx Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 495,328, Aug. 7, 1974, Pat. No. 3,929,990, which is a continuation-in-part of Ser. No. 425,931, Dec. 18, 1973, Pat. No. 3,874,870. This application Oct. 20, 1975, Ser. No. 623,750
The portion of the term of this patent subsequent to Apr. 1, 1992, has been disclaimed.
Int. Cl.² A01N 9/04, 9/20, 9/24, 17/10
U.S. Cl. 424—168 3 Claims

1. A method of controlling the proliferation of fungi in a water-in-oil emulsion which comprises incorporating into said emulsion as a fungicidal agent a condensation product and an amine oxide as an emulsifier, said condensation product being formed by mixing 1,4-dihalo-2-butene and 1,4-bis-dimethylamino-2-butene dissolved in a solvent at room temperature whereby an exothermic reaction is obtained causing the temperature of the mixture to rise, then maintaining the mixture at no higher than reflux temperature until the reaction is complete, the reactants being present in the reaction in relative molar proportions to each other of between about 1:3 and about 3:1, said condensation product being present in the emulsion in a fungicidally effective amount, and said amine oxide being present in an amount to effectively emulsify the composition.

4,005,194

TREATMENT OF PROSTATIC HYPERPLASIA

Edwin Samuel Johnson, Antioch, Ill., assignor to Abbott Laboratories, Chicago, Ill.

Filed June 23, 1975, Ser. No. 589,236
Int. Cl.² A61K 37/02
U.S. Cl. 424—177 6 Claims

1. The method of reducing or preventing undesirable prostatic growth in a warm-blooded animal consisting essentially of administering to said animal a sufficient daily amount to prevent prostatic growth or to reduce prostate size, of a nonapeptide of the formula

L-pGlu-L-His-L-Trp-L-Ser-L-Tyr-X-L-Leu-L-Arg-L-Pro-NH-R

wherein X denotes the optically active D-form of an aminoacid moiety of the formula —NH—CHR′—CO— with R′ being a linear or branched carbon chain of 1–4 carbon atoms and wherein R is lower alkyl.

4,005,195

COMPOSITIONS FOR TREATING HYPERCHOLESTEROLEMIA

Ronald James Jandacek, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Feb. 12, 1976, Ser. No. 657,528
Int. Cl.² A61K 31/72, 31/23
U.S. Cl. 424—180 64 Claims

1. A composition of matter, comprising:

a. an edible, non-absorbable, non-digestible liquid polyol fatty acid polyester having at least 4 fatty acid ester groups, wherein the polyol is selected from the group consisting of sugars and sugar alcohols containing from 4 to 8 hydroxyl groups and wherein each fatty acid group has from about 8 to about 22 carbon atoms; and

b. sufficient anti-anal leakage agent to prevent leakage of said liquid polyester through the anal sphincter.

4,005,196

VITAMINIZED COMPOSITIONS FOR TREATING HYPERCHOLESTEROLEMIA

Ronald James Jandacek, and Fred Hugh Mattson, both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Feb. 12, 1976, Ser. No. 657,529
Int. Cl.² A61K 31/72, 31/23, 31/59
U.S. Cl. 424—180 66 Claims

1. A composition of matter, comprising

a. an edible, non-absorbable, non-digestible liquid polyol fatty acid polyester having at least 4 fatty acid ester groups, wherein the polyol is selected from the group consisting of sugars and sugar alcohols containing from 4 to 8 hydroxyl groups and wherein each fatty acid group has from about 8 to about 22 carbon atoms;

b. sufficient anti-anal leakage agent to prevent leakage of said liquid polyester through the anal sphincter; and

c. sufficient fat-soluble vitamin selected from the group consisting of vitamin A, vitamin D, vitamin E and vitamin K to prevent abnormally low levels of any of said fat soluble vitamins in animals ingesting said composition.

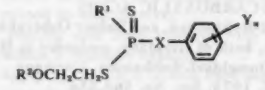
4,005,197

COMBATING INSECTS, ACARIDS AND NEMATODES WITH S-ALKOXYETHYL-PHENYL-DI- AND TRI-THIOPHOSPHONIC ACID ESTERS

Shigeo Kishino, Tokyo; Akio Kudamatsu, Kanagawa, and Shozo Sumi, Tokyo, all of Japan, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Division of Ser. No. 344,799, March 26, 1973, Pat. No. 3,894,124. This application Apr. 23, 1975, Ser. No. 570,972
Claims priority, application Japan, Apr. 6, 1972, 47-33844
Int. Cl.² A01N 9/36
U.S. Cl. 424—216 11 Claims

10. An insecticidal, acaricidal or nematocidal composition comprising an insecticidally, acaricidally or nematocidally effective amount of a compound of the formula



in which,

R^1 and R^2 each independently is C_1-C_6 alkyl,

X is oxygen or sulfur,

Y is C_1-C_6 alkyl, C_1-C_6 alkylmercapto or halogen, and

n is 1 or 2,

in admixture with a diluent.

4,005,198

TREATMENT OF ACNE VULGARIS

Scott D. Skillern, South Bend, Ind., assignor to Robert H. Van Aman, Jupiter, Fla.

Filed Sept. 12, 1975, Ser. No. 612,686
Int. Cl.² A61K *31/65, 31/54*
U.S. Cl. 424—227 2 Claims

1. A method for the treatment of acne vulgaris in a patient having acne vulgaris which comprises orally administering methyclothiazide in a dosage of 2.5 to 5.0 mg. bi-daily.

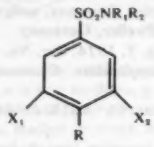
4,005,199

SUBSTITUTED BENZENESULFONAMIDES AS ANTHELMINTICS

Helmut H. Mrozik, Matawan, N.J., assignor to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 541,540, Jan. 16, 1975, abandoned, which is a division of Ser. No. 472,002, May 22, 1974, which is a division of Ser. No. 326,652, Jan. 26, 1973, abandoned, which is a continuation of Ser. No. 135,433, April 19, 1971, abandoned. This application Oct. 6, 1975, Ser. No. 619,981
Int. Cl.² A61K *31/63*
U.S. Cl. 424—228 6 Claims

1. A method for the treatment of mature and immature liver fluke which comprises administering to an animal susceptible to infestation with mature or immature liver fluke a fasciolicidally effective amount of a compound having the formula:



wherein R is amino; X_1 and X_2 are each halogen, trifluoromethyl or nitro; and R_1 and R_2 are each hydrogen or loweralkyl.

4,005,200

METHOD FOR IMPROVING THE MATURITY OF THE PARTURIENT CANAL AND THE SENSITIVITY TO OXYTOCIN

Isamu Utsumi, Kyoto; Tomio Endo, Kobe; Tadaaki Kamata, Ibaraki, and Masayasu Ando, Takatsuki, all of Japan, assignors to Kanebo, Ltd., Tokyo, Japan

Filed July 17, 1975, Ser. No. 596,741
Int. Cl.² A61K *31/565*
U.S. Cl. 424—243 5 Claims

1. A method for improving the maturity of parturient canal and the sensibility of uterine musculature to oxytocin, which comprises administering to a living pregnant human a therapeutically effective amount of dehydroepiandrosterone sulfate or a pharmaceutically acceptable salt thereof at the 37th to 39th week of pregnancy.

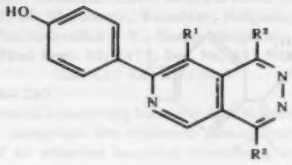
4,005,201

7-(HYDROXYPHENYL)PYRIDO(3,4-d)PYRIDAZINES

Shojiro Yurugi, Kyoto, and Shintaro Kikuchi, Hyogo, both of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Mar. 25, 1975, Ser. No. 562,034
Claims priority, application Japan, Mar. 25, 1974, 49-33679
Int. Cl.² C07D *405/14, 471/14*
U.S. Cl. 424—248.57 10 Claims

1. A pyrido [3,4-d] pyridazine shown by the formula:



wherein R^1 stands for hydrogen or methyl, R^2 stands for morpholino, methyl-morpholino, ethyl-morpholino, piperidino, methyl-piperidino or ethyl-piperidino or a pharmaceutically acceptable nontoxic cation salt or a pharmaceutically acceptable nontoxic acid addition salt thereof.

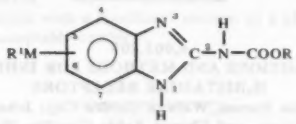
4,005,202

5(6)-BENZENE RING SUBSTITUTED BENZIMIDAZOLE-2-CARBAMATE DERIVATIVES HAVING ANTHELMINTIC ACTIVITY

Colin C. Beard, Palo Alto; John A. Edwards, Los Altos, and John H. Fried, Palo Alto, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Division of Ser. No. 441,222, Feb. 11, 1974, Pat. No. 3,935,209, which is a continuation-in-part of Ser. No. 340,581, March 12, 1973, abandoned. This application Sept. 22, 1975, Ser. No. 615,257
Int. Cl.² A61K *31/495*
U.S. Cl. 424—250 29 Claims

1. A composition for controlling helminths in mammals comprising a pharmaceutically acceptable non-toxic excipient and an anthelmintically effective amount of a compound represented by the formula:



where R is a lower alkyl group having 1 to 4 carbon atoms; R^1 is selected from the group consisting of thiazolyl, pyridyl, imidazolyl, pyrimidinyl, thienyl, pyridazinyl, pyrazinyl, pyrrolyl, pyrazolyl, oxazolyl, furyl, isothiazolyl, isoxazolyl, thiadiazolyl, and triazolyl; and M is O, S, or

the R^1M-substitution being at the 5(6)-position; or a pharmaceutically acceptable salt thereof.

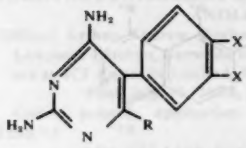
4,005,203

TREATMENT OF MENINGEAL LEUKEMIA WITH DIAMINO DICHLOROPHENYL PYRIMIDINE

Dwight R. Stickney; William S. Simmons; Charles A. Nichol; George H. Hitchings, all of Durham, and Gertrude B. Elion, Chapel Hill, all of N.C., assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

Continuation of Ser. No. 344,179, March 23, 1973, abandoned. This application Feb. 12, 1975, Ser. No. 549,454
Int. Cl.² A61K *31/505*
U.S. Cl. 424—251 5 Claims

1. A method of treating a human infected with meningeal leukemia which comprises internally administering to the infected human an effective non-toxic meningeal leukemia treatment amount of a compound of Formula I



where R is lower alkyl containing 1 or 2 carbon atoms and X is a chlorine atom or a pharmaceutically acceptable salt thereof.

4,005,204

TREATMENT OF NEOPLASMS IN THE BRAIN WITH DIAMINO DICHLOROALKYL PYRIMIDINE

Dwight R. Stickney; William S. Simmons; Charles A. Nichol; George H. Hitchings, all of Durham, and Gertrude B. Elion, Chapel Hill, all of N.C., assignors to Burroughs Wellcome Co., Triangle Park, N.C.

Division of Ser. No. 344,179, March 23, 1973, abandoned. This application Feb. 12, 1975, Ser. No. 549,453

Int. Cl.² A61K *31/505*

U.S. Cl. 424—251 **6 Claims**

1. A method of treating neoplasms in the brain of a mammal which comprises administering to the infected mammal a non-toxic anti-neoplastic effective amount of the compound 2,4-diamino-5-(3′,4′, dichlorophenyl)-6-methylpyrimidine or a pharmaceutically acceptable salt thereof.

4,005,205

COMPOSITIONS AND METHODS FOR INHIBITING H_2HISTAMINE RECEPTORS

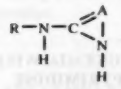
Graham John Durant, Welwyn Garden City; John Colin Emmett, Codicote, and Charon Robin Ganellin, Welwyn Garden City, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

Division of Ser. No. 463,647, April 24, 1974, Pat. No. 3,932,644. This application Oct. 6, 1975, Ser. No. 619,985

Int. Cl.² A61K *31/505*

U.S. Cl. 424—251 **13 Claims**

1. A pharmaceutical composition to inhibit H-2 histamine receptors, said H-2 histamine receptors being those histamine receptors which are not inhibited by mepyramine but are inhibited by burimamide, comprising a pharmaceutical carrier and in an effective amount to inhibit said receptors a heterocyclic compound of the formula:



wherein A taken together with the nitrogen and carbon atoms shown forms a pyrimidine ring, said ring having a keto or thione group and optionally substituted by one or two lower alkyl, phenyl or benzyl groups; R is a grouping of the formula:

$$Het—CH_2Z(CH_2)_n—$$

wherein Het is an imidazole ring, said ring being optionally substituted by lower alkyl, amino, hydroxy or halogen; Z is sulphur or a methylene group and *n* is 2 or 3 or a pharmaceutically acceptable acid addition salt thereof.

4,005,206

[9H]-PYRIDO-[3.4-b]-INDOLES

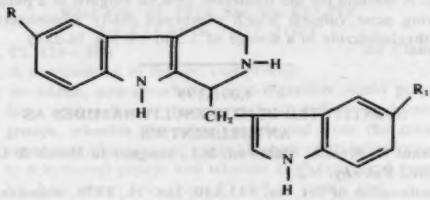
Jean-Cyr Gaignault; Jean Vacher, and Daniel Frechet, all of Paris, France, assignors to Roussel-UCLAF, Paris, France

Filed Apr. 7, 1976, Ser. No. 674,415

Int. Cl.² C07D *401/14*

U.S. Cl. 424—263 **13 Claims**

1. A compound selected from the group consisting of compounds of the formula



wherein R and R_1 are individually selected from the group consisting of hydrogen, halogen, hydroxy, alkoxy of 1 to 5 carbon atoms and benzyloxy with the proviso that R_1 is not hydroxy when R is halogen, alkoxy or benzyloxy and their non-toxic, pharmaceutically acceptable acid addition salts.

4,005,207

SYNERGISTIC THERAPEUTIC COMPOSITION FOR THE TREATMENT OF MYCOBACTERIOSES

Enno Freerksen, Borstel, Germany, assignor to Saarstickstoff-Fatol GmbH, Schiffweiler, Germany

Filed Aug. 7, 1974, Ser. No. 495,421

Claims priority, application Germany, Aug. 10, 1973, 2340515

Int. Cl.² A61K *31/44*

U.S. Cl. 424—263 **8 Claims**

7. A process for treating mycobacterioses in mammals which comprises administering orally to mammals having mycobacterial diseases a synergistic composition comprising about 5 to 10 mg isonicotinic acid hydrazide, about 5 to 10 mg 2-propyl-thioisonicotinic acid amide, and about 1 to 2 mg 4,4′-diaminodiphenyl-sulfone per kilogram of body weight.

4,005,208

N-HETEROCYCLIC-9-XANTHENYLAMINES

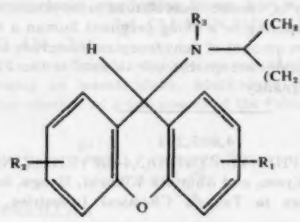
Paul E. Bender, Willingboro, N.J., and Bernard Loev, Broomall, Pa., assignors to SmithKline Corporation, Philadelphia, Pa.

Filed May 16, 1975, Ser. No. 578,226

Int. Cl.² C07D *405/12*

U.S. Cl. 424—267 **6 Claims**

1. A compound of the formula:



in which:

R_1 is hydrogen, halogen, hydroxy, lower alkyl or lower alkoxy;

R_2 is hydrogen, halogen, lower alkyl or lower alkoxy;

R_3 is hydrogen or lower alkyl;

R_4 is hydrogen, lower alkyl, allyl, propargyl, cycloalkyl having 3 to 6 carbon atoms, lower alkanoyl, lower alkoxycarbonyl, carbamoyl, N-lower alkylcarbamoyl, N,N-dilower alkylcarbamoyl, phenyl or benzyl;

m is 1 or 2 and *n* is 2 or 3, the sum of *m* and *n* being 3 or 4 or a pharmaceutically acceptable acid addition salt thereof.

4,005,209

ANTIARRHYTHMIC METHOD UTILIZING FLUOROALKOXY-N-PIPERIDYL AND PYRIDYL BENZAMIDES

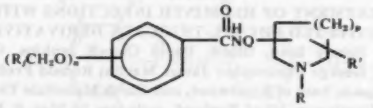
Elden H. Banitt, Woodbury, and William R. Bronn, St. Paul, both of Minn., assignors to Riker Laboratories, Inc., Northridge, Calif.

Division of Ser. No. 457,099, April 1, 1974, Pat. No. 3,900,481. This application May 27, 1975, Ser. No. 580,891

Int. Cl.² A61K *31/445, 31/40*

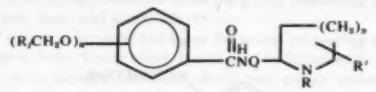
U.S. Cl. 424—267 **15 Claims**

1. A method for the treating and prevention of arrhythmias in a mammal in need thereof comprising administering an effective dose less than the toxic amount of the compound of the formula:



wherein R_f is a perfluoroalkyl radical containing from one to three carbon atoms, *n* is one to three, *p* is one or two, Q is a carbon-nitrogen bond, methylene or methylmethylene and R and R′ are hydrogen, methyl or ethyl, or a pharmaceutically acceptable salt thereof, to said mammal.

5. A method for the treating and prevention of arrhythmias in a mammal in need thereof comprising administering an effective dose less than the toxic amount of a compound of the formula:



wherein R_f is a perfluoroalkyl radical containing from one to three carbon atoms, *n* is one to three, *p* is one or two, Q is methylene or methylmethylene and R and R′are hydrogen, methyl or ethyl, or a pharmaceutically acceptable salt thereof to said mammal.

4,005,210

PROTEIN CONTAINING EMOLLIENT COMPOSITION FOR A SKIN MOISTURIZER

Joseph Gubernick, Port Washington, N.Y., assignor to Estee Lauder, Inc., New York, N.Y.

Filed July 3, 1975, Ser. No. 593,136

Int. Cl.² A61K *7/48*

U.S. Cl. 424—359 **2 Claims**

1. An emollient composition comprising from about 2 to about 20% isodecyl neopentanoate, from about 0.25 to 2% oleolyl polypeptide which is a hydrolyzed animal protein, and up to 97% mineral oil.

4,005,211

LACTATION STIMULATION EMPLOYING PIMOZIDE

Robert P. H. M. Marsboom, Vosselaar, Belgium, assignor to Janssen Pharmaceutica N.V., Beerse, Belgium

Filed Sept. 10, 1975, Ser. No. 611,940

Int. Cl.² A61K *31/445*

U.S. Cl. 424—267 **2 Claims**

1. A process of stimulating lactation in milk secreting mammals which comprises the systemic administration to said mammals of an effective lactation stimulating amount of a member selected from the group consisting of 1- 1-[4,4-bis(4-fluorophenyl)butyl]-4-piperidinyl -1,3-dihydro-2H-benzimidazol-2-one and the pharmaceutically acceptable acid addition salts thereof.

4,005,212

IMIDAZO[2,1-b]THIAZOLE DERIVATIVES

Francois Debarre, Antony; Claude Jeanmart, Brunoy, and Pierre Edouard Simon, Hauts-de-Seine, all of France, assignors to Rhone-Poulenc S.A., Paris, France

Division of Ser. No. 419,900, Nov. 28, 1973. This application May 12, 1975, Ser. No. 576,297

Claims priority, application France, Nov. 30, 1972, 72.42580; Nov. 2, 1973, 73.35158

Int. Cl.² A61K *31/425*

U.S. Cl. 424—270 **1 Claim**

1. A pharmaceutical composition having antidepressant, psychoenergising and anorexigenic activity which comprises as active ingredient

an effective amount of 2-phenyl-2,3,5,6-tetrahydroimidazo[2,1-b]thiazole, or a non-toxic acid addition salt thereof,

in association with a significant amount of a pharmaceutically acceptable carrier.

4,005,213

2,5-SUBSTITUTED-1,3,4-THIADIAZOLES AS FUNGICIDES

Ludwig Nüsslein; Ernst Albrecht Pieroh, and Kurt Röder, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin, Germany

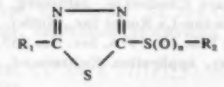
Continuation-in-part of Ser. No. 298,274, Oct. 17, 1972, abandoned, which is a continuation-in-part of Ser. No. 883,253, Dec. 8, 1969, abandoned. This application Dec. 11, 1974, Ser. No. 531,901

Claims priority, application Germany, Dec. 21, 1968, 1817069

Int. Cl.² A01N *9/12, 9/20*

U.S. Cl. 424—270 **7 Claims**

1. A method for the protection of plants against infestation by fungi which comprises applying to said plants a fungi controlling amount of a compound having the structure:



wherein R_1 is a lower haloalkyl having from 1 to 7 carbon atoms, R_2 is an alkyl group having from 1 to 8 carbons, and *n* is 1 or 2.

4,005,214

WATER-SOLUBLE AMOXICILLIN SALTS

André Furlenmeier, Basel, and Peter Quitt, Fullinsdorf, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Aug. 11, 1975, Ser. No. 603,406
Claims priority, application Switzerland, Aug. 21, 1974, 11433/74; June 26, 1975, 8309/75
Int. Cl.² C07D *499/68*
U.S. Cl. 424—271 4 Claims

1. The choline salt of amoxicillin.

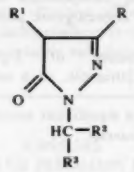
4,005,215

PYRAZOL-5-ONES

Eike Müller; Karl Meng, both of Wuppertal; Egbert Wehinger, Neviges, and Harald Horstmann, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Division of Ser. No. 461,282, April 15, 1974, Pat. No. 3,957,814. This application Jan. 14, 1975, Ser. No. 540,815
Claims priority, application Germany, Apr. 17, 1973, 2319280; Dec. 19, 1973, 2363139
Int. Cl.² A61K *31/415*
U.S. Cl. 474—273 40 Claims

1. A pharmaceutical composition useful for effecting diuresis and saluresis in humans and animals and for treating hypertension in humans and animals which comprises a diuretically effective amount, a saluretically effective amount, or an antihypertensively effective amount of a compound of the formula:



or a pharmaceutically acceptable nontoxic salt thereof, wherein

R is trifluoromethyl;

R^1 is hydrogen, lower alkyl or lower alkenyl;

R^2 is lower alkyl; and

R^3 is aryl of 6 to 10 carbon atoms substituted by:

a. 1 or 2 of the same or different substituents selected from the group consisting of halogen, trifluoromethyl, lower alkyl, lower alkenyl and lower alkoxy;

b. cycloalkyl of 5, 6 or 7 carbon atoms or cycloalkenyl of 5, 6 or 7 carbon atoms;

c. nitro; or

d. a substituent selected from the group consisting of trifluoromethyl and nitro, and 1 or 2 of the same or different substituents selected from the group consisting of lower alkyl, lower alkenyl, lower alkoxy, halogen and trifluoromethyl; or naphthyl;

in combination with a pharmaceutically acceptable, nontoxic, inert diluent or carrier.

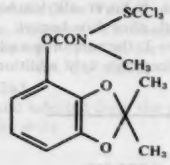
4,005,216

PHENYL CARBAMATE

Madhukar Subraya Chodnekar, Seltisberg, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Feb. 12, 1976, Ser. No. 657,507
Claims priority, application Switzerland, Mar. 7, 1975, 2905/75
Int. Cl.² A61K *31/36*
U.S. Cl. 424—282 4 Claims

1. 2,3-(Isopropylidenedioxy)phenyl-methyl[(trichloromethyl)thio]carbamate of the formula:



(I)

2. A composition effective against flies, caterpillars, bettles, aphids and Hemiptera comprising an insecticidal effective amount of the compound 2,3-(isopropylidenedioxy)phenylmethyl[(trichloromethyl)thio]carbamate and a compatible inert carrier.

3. A method for providing a locus subject to or subjected to attack by insects selected from the group consisting of flies, caterpillars, beetles, aphids, and Hemiptera free from such attack comprising applying to said locus an insecticidal effective amount of 2,3-(isopropylidenedioxy)phenyl-methyl[(trichloromethyl)thio]carbamate.

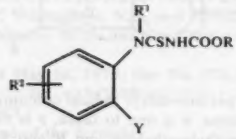
4,005,217

TREATMENT OF HELMINTH INFECTIONS WITH SUBSTITUTED PHENYL-THIOUREA DERIVATIVES

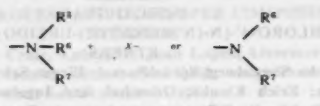
Samuel Sidney Berg, Ilford; David Conwil Jenkins, Gidea Park; George Christopher James Martin; Ronald Frederick Phillipson, both of Brentwood, and Garth Molesdale Thompson, Upminster, all of England, assignors to May & Baker Limited, England

Filed June 15, 1971, Ser. No. 153,407
Claims priority, application United Kingdom, June 26, 1970, 31209/70; Dec. 11, 1970, 59111/70; Mar. 25, 1971, 7850/71; Apr. 1, 1971, 8462/71; Apr. 1, 1971, 8466/71
Int. Cl.² A61K *31/27*
U.S. Cl. 424—300 16 Claims

1. Method for the treatment of helminth infections in man and domestic animals which comprises administering to man or a domestic animal infected with helminths an anthelmintically effective amount of at least one benzene derivative of the formula:



wherein R represents an aliphatic hydrocarbon group of 1 to 4 carbon atoms which is unsubstituted or substituted by halogen or alkoxy of 1 to 4 carbon atoms, R^1 represents hydrogen or methyl, R^2 represents hydrogen, halogen, alkyl of 1 to 4 carbon atoms, alkanoylamino of 1 to 4 carbon atoms which is unsubstituted or substituted by cycloalkyl of 3 to 6 carbon atoms, alkoxycarbonylamino of 2 to 4 carbon atoms, alkanoyl of 2 to 4 carbon atoms, benzoyl or N-methylmethanesulphonylamino, and Y represents a group $—NR^3R^4$, wherein R^3 and R^4 each represent hydrogen, or R^3 represents hydrogen or methyl and R^4 represents alkanoyl of 1 to 4 carbon atoms which is unsubstituted or substituted by cycloalkyl of 3 to 6 carbon atoms, alkoxycarbonyl of 2 to 4 carbon atoms, or a group —COAZ, wherein A represents a straight chain aliphatic hydrocarbon group of 1 to 4 carbon atoms which is unsubstituted or substituted by methyl, and Z represents carboxy or a group of the formula:



wherein R^5 represents hydrogen or alkyl of 1 to 4 carbon atoms, R^6 represents hydrogen, alkyl of 1 to 4 carbon atoms or phenylalkyl with 1 or 2 carbon atoms in the alkyl moiety, and R^7 represents hydrogen or alkyl of 1 to 4 carbon atoms, and X^- represents a pharmaceutically acceptable anion, or where Y represents a primary amino group, an acid addition salt thereof having a pharmaceutically acceptable anion.

4,005,218

ANTIPARASITIC SALICYLANILIDE DERIVATIVES

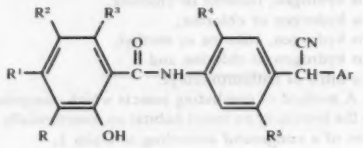
Marcel A. C. Janssen, Vosselaar, and Victor K. Sipido, Merksem, both of Belgium, assignors to Janssen Pharmaceutica N.V., Beerse, Belgium

Continuation-in-part of Ser. No. 559,616, March 18, 1975, abandoned. This application Jan. 13, 1976, Ser. No. 648,681

Int. Cl.[2] A61K *31/38, 31/275;* **C07D** *333/24;* **C07C** *121/80*

U.S. Cl. 424—304 **11 Claims**

1. A chemical compound selected from the group consisting of a salicylanilide having the formula:



and the pharmaceutically acceptable salts thereof, wherein:

R is a member selected from the group consisting of hydrogen, halo, lower alkyl and nitro;

R^1 is a member selected from the group consisting of hydrogen and halo;

R^2 is a member selected from the group consisting of hydrogen, halo, lower-alkyl and nitro;

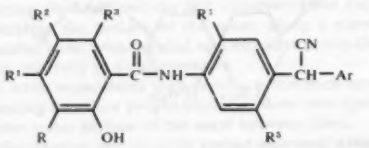
R^3 is a member selected from the group consisting of hydrogen, hydroxy and lower alkyl, provided that when said R^3 is hydroxy or lower alkyl then said R^1 is hydrogen;

R^4 is a member selected from the group consisting of hydrogen, halo and lower alkyl;

R^5 is a member selected from the group consisting of hydrogen, halo, lower alkyl, cyano and trifluoromethyl; and

Ar is a member selected from the group consisting of phenyl, substituted phenyl, thienyl, halothienyl and naphthalenyl, wherein said "substituted phenyl" represents phenyl having from 1 to 3 substituents independently selected from the group consisting of halo, lower alkyl, lower alkyloxy and trifluoromethyl.

6. An antiparasitic composition comprising an effective antiparasitic amount of a compound selected from the group consisting of a salicylanilide having the formula:



and the pharmaceutically acceptable salts thereof, wherein:

R is a member selected from the group consisting of hydrogen, halo, lower alkyl and nitro;

R^1 is a member selected from the group consisting of hydrogen and halo;

R^2 is a member selected from the group consisting of hydrogen, halo, lower alkyl and nitro;

R^3 is a member selected from the group consisting of hydrogen, hydroxy and lower alkyl, provided that when said R^3 is hydroxy or lower alkyl then said R^1 is hydrogen;

R^4 is a member selected from the group consisting of hydrogen, halo and lower alkyl;

R^5 is a member selected from the group consisting of hydrogen, halo, lower alkyl, cyano and trifluoromethyl; and

Ar is a member selected from the group consisting of phenyl, substituted phenyl, thienyl, halothienyl and naphthalenyl, wherein said "substituted phenyl" represents phenyl having from 1 to 3 substituents independently selected from the group consisting of halo, lower alkyl, lower alkyloxy and trifluoromethyl,

in admixture with a pharmaceutically acceptable carrier.

4,005,219

PHARMACEUTICAL COMPOSITIONS AND THEIR ADMINISTRATION FOR THE PROPHYLAXIS OF ASTHMA, HAYFEVER AND RHINITIS

Derek Richard Buckle, Redhill, and Harry Smith, Horsham, both of England, assignors to Beecham Group Limited, Great Britain

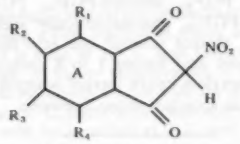
Division of Ser. No. 409,164, Oct. 24, 1973, Pat. No. 3,920,725. This application Mar. 21, 1975, Ser. No. 560,733

Claims priority, application United Kingdom, Apr. 11, 1974, 52203/74

Int. Cl.[2] A61K *31/215*

U.S. Cl. 424—305 **22 Claims**

1. A pharmaceutical composition in a form suitable for oral, parenteral or insufflation administration to humans which comprises an amount of a compound of the formula (I) or a salt thereof:



(I)

wherein R_1, R_2, R_3 and R_4 are each hydrogen, lower alkyl, phenyl, benzyl, lower alkoxy, lower acyloxy, carboxy, lower alkoxycarbonyl or halogen, and wherein the ring marked A contains 1 or 2 double bonds, sufficient to be effective for the prophylaxis of asthma, hayfever or rhinitis in combination with a pharmaceutically-acceptable, nontoxic, inert diluent or carrier suitable for said administration form.

4,005,220

HEMOSTATIC COMPOSITIONS COMPRISING SALTS OF SUBSTITUTED HYDROQUINONE SULFONIC ACID

Antonio Esteve-Subirana, Barcelona, Spain, assignor to Laboratorios del Dr. Esteve, S.A., Barcelona, Spain

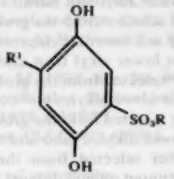
Division of Ser. No. 441,415, Feb. 11, 1974. This application Apr. 3, 1975, Ser. No. 564,735

Claims priority, application Switzerland, Feb. 20, 1973, 2395/73

Int. Cl.[2] A61K *31/185, 31/205*

U.S. Cl. 424—315 **14 Claims**

1. A medicament having a hemostatic effect and a protective effect on the capillaries, comprising a pharmaceutically acceptable carrier and a hemostatically effective amount of a compound of the formula.



in which R^1 is selected from the group consisting of a linear and a branched alkyl group with 1 to 6 carbon atoms and R is selected from the group consisting of lithium, sodium, ammonium an equivalent of calcium, the cation of a lower alkyl amine and the cation of cyclohexylamine.

4,005,221
USE OF PROSTAGLANDINS TO INDUCE MENSTRUATION

Sultanali M. M. Karim, 82 Eng Neo Ave., Singapore 11

Continuation of Ser. No. 457,006, April 1, 1974, abandoned, which is a continuation of Ser. No. 151,898, June 10, 1971, abandoned, which is a continuation-in-part of Ser. No. 73,670, Sept. 18, 1970, abandoned. This application Sept. 29, 1975, Ser. No. 617,888

Int. Cl.² A61K *31/215, 31/19*

U.S. Cl. 424—317 **8 Claims**

1. A method of inducing menstruation in a sexually-mature, nonpregnant, nonmenopausal human female which consists essentially of administering intravaginally to a said female within a period of from about 4 days before to about 6 days after said female's expected day of onset of menses a vaginal dosage unit form supplying an effective, nontoxic amount for inducing the menstruation of a prostaglandin selected from the group consisting of PGE_1, PGE_2, PGE_3, dihydro-PGE_1, $PGF_{1\alpha}$, $PGF_{2\alpha}$, $PGF_{3\alpha}$, dihydro-$PGF_{1\alpha}$, $PGF_{1\beta}$, $PGF_{2\beta}$, $PGF_{3\beta}$, dihydro-$PGF_{1\beta}$, pharmaceutically acceptable salts thereof, acylates thereof wherein the acyl radical is that of a lower alkanoic acid having 1 to 8 carbon atoms, inclusive, and carboxylate esters thereof wherein the esterfying radical has 1 to 8 carbon atoms, inclusive.

4,005,222
MUCOLYTIC MERCAPTOACYLAMIDOBENZOIC AND BENZENESULFONIC ACID COMPOUNDS AND PROCESS

Tellis Alexander Martin, and William Timmey Comer, both of Evansville, Ind., assignors to Mead Johnson & Company, Evansville, Ind.

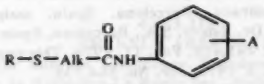
Filed May 21, 1975, Ser. No. 579,650

Int. Cl.² A61K *31/195*

U.S. Cl. 424—319 **8 Claims**

1. A process for liquiefaction of mucus which comprises contacting said mucus with a mucolytically effective amount of a member selected from the group consisting of compounds having Formula I

Formula I



wherein

A is meta or para CO_2H;

Alk is a straight or branched divalent alkylene radical of from 1 to 3 carbon atoms inclusive;

R is hydrogen or alkanoyl having up to 18 carbon atoms inclusive; and a pharmaceutically acceptable salt thereof.

4,005,223
INSECTICIDAL 2-CHLORO-4'-[N-(N'-BENZOYL)-UREIDO]-DIPHENYL ETHERS

Wilhelm Sirrenberg, Sprockhoevel; Jürgen Schramm, Dormagen; Erich Klauke, Odenthal, and Ingeborg Hammann, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

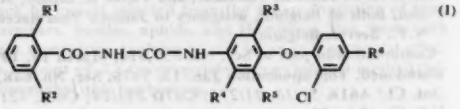
Filed Feb. 3, 1976, Ser. No. 654,835

Claims priority, application Germany, Feb. 6, 1975, 2504982; Feb. 6, 1975, 2504984; June 28, 1975, 2528917; Aug. 22, 1975, 2537413

Int. Cl.² A01N *9/20*

U.S. Cl. 424—322 **12 Claims**

1. A 2-chloro-4'-[N-(N'-benzoyl)-ureido]-diphenyl ether of the formula



(I)

in which

R^1 is fluorine, chlorine, bromine or methyl,

R^2 is hydrogen, fluorine or chlorine,

R^3 is hydrogen or chlorine,

R^4 is hydrogen, chlorine or methyl,

R^5 is hydrogen or chlorine and

R^6 is nitro or trifluoromethyl.

11. A method of combating insects which comprises applying to the insects or an insect habitat an insecticidally effective amount of a compound according to claim 1.

4,005,224
METHOD OF COMBATING INFLUENZA TYPE A AND B AND PARAINFLUENZA TYPE 3 VIRUSES WITH AMINOSPIRANES AND AMINOALKYLSPIRANES

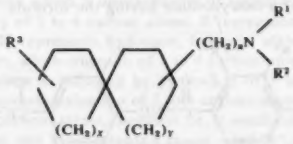
Robert Walker Tankersley, Jr., Richmond, Va., assignor to A. H. Robins Company, Incorporated, Richmond, Va.

Continuation-in-part of Ser. No. 487,950, July 11, 1974, abandoned, which is a continuation-in-part of Ser. No. 350,606, April 12, 1973, abandoned. This application Apr. 5, 1976, Ser. No. 674,016

Int. Cl.² A61K *31/13*

U.S. Cl. 424—325 **13 Claims**

1. A method for treating viral infections caused by influenza types A and B or parainfluenza type 3 which consists of administering to a living animal body in need of said treatment against said viruses from about 25 milligrams to about 250 milligrams of a compound selected from the group consisting of aminospiranes of the formula:



wherein;

Y is one or two,

X is one or two,

n is zero to three inclusive,

R^1 and R^2 are hydrogen or lower alkyl,

R^3 is hydrogen or methyl, and

pharmaceutically acceptable salts thereof.

4,005,225

BAKERY PROCESS AND DEVELOPER COMPOSITION THEREFOR

Theodore W. Craig, Lafayette; Juan Lopez, Livermore, and Richard G. Henika, Alamo, all of Calif., assignors to Patent Technology Inc., San Francisco, Calif.

Continuation-in-part of Ser. No. 604,197, Aug. 13, 1975, abandoned. This application July 30, 1976, Ser. No. 710,215
Int. Cl.² A21D 2/22, 2/28
U.S. Cl. 426—21 13 Claims

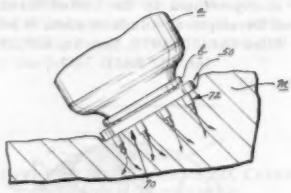
1. A short time process for the manufacture of leaven bread and like bakery products, particularly characterized by a very soft and fine-grained texture and also by a very low specific volume, comprising the steps of adding to conventional dough ingredients including flour, yeast, salt, and water from 0.05 to 0.15% on the weight of the flour of a developer composition in the form of a blended dry mixture of (a) 0.003 to 0.009% of an amino acid reducing substance selected from the group consisting of cysteine, glutathione and mixtures thereof (b) 0.005 to 0.015% ascorbic acid (c) 0.030 to 0.060% of monocalcium phosphate, together with 0.020 to 0.050% of a dry blending agent, thereafter mixing said dough ingredients and developer composition to form a dough, forming said dough into units for baking, and thereafter proofing and baking said units to provide final baked products having the particular desired characteristics described.

4,005,226

MULTIPLE NOZZLE DISPENSER HEAD

Dewey B. Dykes, Birmingham; E. Michael Powers, Mountain Brook; T. Kenneth Foster, Birmingham, and Robert E. Rogers, Mountain Brook, all of Ala., assignors to The Jim Dandy Company, Birmingham, Ala.

Filed June 9, 1975, Ser. No. 585,400
Int. Cl.² A23B 1/16
U.S. Cl. 426—281 2 Claims



1. The method of causing a liquid to permeate meat for tenderizing, flavoring and the like, comprising the steps of

penetrating the surface of the meat, along a plurality of parallel axes, with parallel spaced-apart prong-like nozzles, whereby to form apertures,

then, while maintaining such nozzles within such apertures, pressing a surface perpendicular to their axes against the entire outer surface of the meat between them,

thereby causing the meat to spread sideward about such nozzles and hold such apertures sealed, and

while so holding such apertures sealed, discharging liquid under super-atmospheric pressure through such nozzles into the meat,

whereby to permeate the meat without escaping about such nozzles through such apertures.

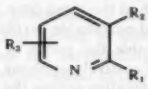
4,005,227

FLAVORING AGENT

Max Winter, Geneva; Fritz Gautschi, Vaud; Ivon Flament; Max Stoll, both of Geneva, all of Switzerland, and Irving M. Goldman, Niantic, Conn., assignors to Firmenich & Cie, Geneva, Switzerland

Division of Ser. No. 243,866, April 13, 1972, abandoned, which is a division of Ser. No. 70,560, Sept. 8, 1970, Pat. No. 3,702,253, which is a continuation of Ser. No. 543,069, April 18, 1966, abandoned, which is a continuation-in-part of Ser. No. 452,342, April 30, 1965, abandoned. This application June 24, 1974, Ser. No. 482,694
Int. Cl.² A23L 1/234
U.S. Cl. 426—537 88 Claims

1. As a new composition of matter a soluble coffee material having added thereto a minor, but flavor-modifying amount of a compound selected from the group of compounds having the general formula:



wherein R_1, R_2, and R_3 are hydrogen, vinyl, propenyl, methyl, ethyl, isobutyl, allyl, phenyl or benzyl; provided that the symbols R_1, R_2, and R_3 are not all hydrogen.

4,005,228

MILK FAT CONTAINING PRODUCTS AND PROCESSES THEREFOR

Robert Norris, Private Bag, Palmerston North, New Zealand

Filed Sept. 30, 1974, Ser. No. 510,626
Int. Cl.² A23D 3/02; A23C 23/00
U.S. Cl. 426—586 12 Claims

1. A process for producing a soft dairy spread comprising the steps of

a. fractionating a milkfat into three fractions, said fractions comprising a first fraction in which substantially all the milk fat is solid at 20° C, said first fraction melting increasingly at higher temperatures, a second fraction in which substantially all the milk fat is solid at 0° C and liquid at 20° C, and a third fraction in which substantially all the milk fat is melted at 0° C; and

b. blending said first and third fractions in a ratio of about 1:3 such that the solid fat content of the soft dairy spread remains substantially constant over a temperature range of 5° to 22° C.

4,005,229

NOVEL METHOD FOR THE RAPID DEPOSITION OF GOLD FILMS ONTO NON-METALLIC SUBSTRATES AT AMBIENT TEMPERATURES

Richard G. Miller, Pittsburgh, and Roy L. Cavitt, New Kensington, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed June 23, 1975, Ser. No. 589,234
Int. Cl.² C23C 3/02
U.S. Cl. 427—304 31 Claims

1. In a method of preparing gold films on non-metallic substrates comprising the steps of sensitizing and activating a surface of the substrate and then contacting the activated surface with an aqueous solution of a gold salt and a complexing agent in the presence of a hydrazine or hydroxylamine reducing agent, the improvement which comprises aging the gold solution until it has faded from bright yellow to almost colorless prior to the step of contacting the activated surface of the substrate and carrying out said contacting step in the presence of divalent mercury, cadmium, lead or a mixture of such divalent ions.

4,005,230

PROCESS FOR THE TREATMENT, PARTICULARLY DYEING AND PRINTING OF GOODS

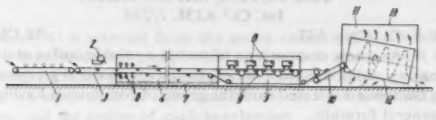
Hans Fleissner, Riehen, Basel, Switzerland, assignor to Vepa AG, Switzerland

Filed Dec. 12, 1974, Ser. No. 532,179

Claims priority, application Germany, Dec. 14, 1973, 2362109

Int. Cl.² D06P 5/02

U.S. Cl. 427—354 5 Claims



1. A process for dyeing and printing of a plurality of piece goods of finite length at the same time, said piece goods comprising medium fluid-permeable textile goods as well as medium fluid-impermeable flat goods in a continuous manner, which comprises successively applying a dye to a plurality of said piece goods, thereafter setting the dye with a heated gas, washing away any residue components with a washing liquid and drying the goods; a plurality of said piece goods being constantly turned about, fulled, and surrounded with a heated gas during said drying.

4,005,231

TREATMENT OF FIBRES

Charles Smith, South Glamorgan, Wales, assignor to Dow Corning Limited, Barry, Galmorgan, Wales

Filed May 15, 1975, Ser. No. 577,583

Claims priority, application United Kingdom, May 28, 1974, 23480/74

Int. Cl.² B05D 3/02

U.S. Cl. 427—387 7 Claims

1. A process for the treatment of keratinous fibres which comprises applying thereto from 0.1 to 10% by weight of a composition comprising the product obtained by mixing (A) a polydiorganosiloxane having terminal silicon-bonded hydroxyl radicals and a molecular weight of at least 750, at least 50% of the organic substituents in the polydiorganosiloxane being methyl radicals, any other organic substituents being monovalent hydrocarbon radicals having from 2 to 30 carbon atoms, (B) an organosilicon compound selected from the group consisting of organosilanes of the general formula $RSi-R'_nX_{3-n}$ wherein R represents a monovalent radical composed of carbon, hydrogen, nitrogen and, optionally, oxygen, which radical contains at least two amine groups and is attached to silicon through a silicon to carbon linkage, R' represents an alkyl radical or an aryl radical, each X represents an alkoxy radical having from 1 to 14 inclusive carbon atoms and n is 0 or 1, and partial hydrolysates and condensates of said organosilanes, and (C) from 1 to 15% by weight based on the total weight of (A) and (B) of an organic or organosilicon compound containing at least one hydroxyl radical attached to an aliphatic carbon atom, and thereafter curing the applied composition.

4,005,232

COATINGS OF METAL PHOSPHATES ON METALS OR GLASS

Neville Colebourne; Nicholas Rolfe, and Kevin Thomas McAloon, all of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 272,495, July 17, 1972, abandoned. This application Feb. 25, 1975, Ser. No. 552,748

Claims priority, application United Kingdom, Oct. 29, 1971, 50354/71; Nov. 4, 1971, 51293/71; Nov. 26, 1971, 55002/71

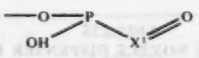
Int. Cl.² B32B 17/06

U.S. Cl. 428—35 7 Claims

1. A coated glass article comprising a glass substrate and a coating thereon which has a thickness of 0.01 to 5 microns and is transparent to visible light but ultra-violet light absorbing, said coating being identifiable as the dried residue of a liquid coating composition containing an organic component and a solution of a metal phosphate compound wherein the metal of the compound is selected from the group consisting of iron, titanium, a mixture of iron and titanium and a mixture of iron and chromium, and wherein the phosphate of the compound is an oxyacid of phosphorus, or a compound capable of forming such an oxyacid in the solution of the said compound, the oxyacid being an ortho- or meta-acid of the structure (1)

(1)

where X^1 and X^2 are the same or different and are selected from hydrogen, hydroxyl, halide or which may have the structure (2) to provide pyrophosphoric acid



(2)

4,005,233

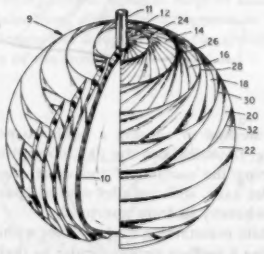
FILAMENT WOUND STRUCTURE AND METHOD

William S. Dritt, Oak Ridge; Howard L. Gerth, Knoxville; Charles E. Knight, Jr., Knoxville, and Robert M. Pardue, Knoxville, all of Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Oct. 30, 1975, Ser. No. 627,394

Int. Cl.² B65D 7/42

U.S. Cl. 428—35 10 Claims



1. A filament wound structure having a substantially spherical configuration comprising a mandrel, a plurality of sequentially applied filament band sets disposed axisymmetrically about the surface of said mandrel and spaced sequentially along the longitudinal plane thereof, each filament band in each filament band set being formed of a continuous filament circumferentially wound about said mandrel a predetermined

number of circuits with each circuit of filament about said mandrel being along a plane parallel to and in a side-by-side abutting relationship with the immediate previously wound circuit of filament, the filament bands of each band set being disposed in an overlapping arrangement at a latitute nearest the poles of the sphere and in a substantially side-by-side relationship at the equator of the sphere except for the first and last bands being displaced radially from each other, the number of bands forming each band set being equal to the total number of bands required to cover the mandrel at the equator thereof with the bands disposed in the side-by-side relationship, and with the total thickness of the outermost set of filament bands plus any underlying segments of any other band sets being essentially uniform between the poles and the equator of said sphere.

4,005,234

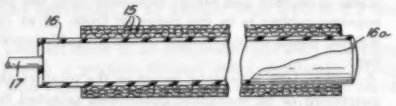
TUBULAR ARTICLE AND METHOD OF MAKING THE SAME

James D. Stroupe, Newtown, Pa., assignor to Sipler Plastics, Inc., Doylestown, Pa.

Division of Ser. No. 402,131, Oct. 1, 1973. This application Oct. 10, 1974, Ser. No. 513,524

Int. Cl.² F16L 9/00

U.S. Cl. 428—36 **9 Claims**



1. In a monolithic tubular article comprising

a light weight non-metallic rigid tubular body having a varying cross section between its ends and a fixed tortuous non-planar longitudinal axis between its ends and a plurality of interior circumferentially expanded tubular continuous seamless knitted fabrics conforming to the shape of the surface of the body and surrounded by and impregnated with an integral rigid cured resin the improvement which comprises

an outer lamina modifying the action of the exterior surface of the body consisting of a single layer held in secured relation to the body by the resin of the body and extending over a selected limited part of the exterior of the body.

4,005,235

DENSE SINTERED BORON CARBIDE CONTAINING BERYLLIUM CARBIDE

Svante Prochazka, Ballston Lake, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Nov. 17, 1975, Ser. No. 632,496

Int. Cl.² C04B 35/52; B22F 3/00

U.S. Cl. 428—36 **4 Claims**

1. A polycrystalline sintered body comprised of boron carbide wherein the boron/carbon molar ratio ranges from 3.5 to 4.5 and beryllium carbide in an amount ranging from 0.5% by weight to 3% by weight of said boron carbide, said sintered body having a substantially uniform microstructure composed of substantially equiaxed grains of said boron carbide having a grain size ranging from about 30 microns to about 300 microns with said beryllium carbide distributed substantially uniformly throughout said boron carbide and having a grain size less than 10 microns, said sintered body having a density ranging from 85% to about 96% of the theoretical density for said boron carbide.

4,005,236

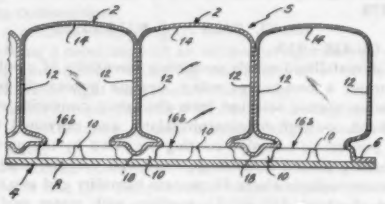
EXPANDABLE MULTICELLED CUSHIONING STRUCTURE

Robert H. Graebe, 4 Signal Hill Blvd., Belleville, Ill. 62223

Division of Ser. No. 360,743, May 16, 1973, Pat. No. 3,870,450. This application Feb. 28, 1975, Ser. No. 554,117

Int. Cl.² A47C 27/08

U.S. Cl. 428—72 **11 Claims**



1. A cushion device comprising: a base formed from a fluid impervious material and having at least one cavity therein which is isolated from the surrounding atmosphere and is capable of retaining a fluid under pressure; and a plurality of cells connected to the base and formed from a fluid impervious material which is flexible, the cells having hollow interiors which are isolated from the surrounding atmosphere and open into the cavity of the base such that the interiors of all of the cells communicate through the cavity of the base, the cells having side walls with the sidewalls of adjacent cells being located opposite each other, the cells when deflated being generally spaced apart and having flutes along their side walls, the flutes of each cell being generally parallel and arranged around the entire cell and further extending away from the base, the cells being sufficiently flexible that when pressurized they will expand laterally such that the flutes are generally obliterated and the side walls of adjacent cells are in contact for substantial portions of their lengths so as to interfere with each other, the cells when pressurized further being such that the ends of the cells form a generally continuous outwardly presented surface which conforms to the shapes of objects brought against it.

4,005,237

NON-BLEED PRE-PRINTED SPIRIT DUPLICATING MASTERS

Irving Panken, Dayton, Ohio, assignor to The Mazer Corporation, Dayton, Ohio

Continuation-in-part of Ser. No. 490,979, July 23, 1974, Pat. No. 3,962,526. This application Mar. 25, 1976, Ser. No. 670,427

The portion of the term of this patent subsequent to June 8, 1993, has been disclaimed.

Int. Cl.² B41M 5/04

U.S. Cl. 428—195 **7 Claims**

1. A non-bleed pre-printed spirit duplicating master comprising:

a. a substantially opaque paper sheet having a front surface and a back side,

b. said paper sheet having an oleophobic resinous barrier material treated front surface to give said sheet a kit test rating of three or more,

c. a positive image printed on the front surface and overlying said oleophobic resinous barrier material, and

d. a hot melt spirit duplicating ink reverse printed directly on said back side so as to form a pre-printed master.

4,005,238

METALLIZED ARTICLES AND METHOD OF PRODUCING THE SAME

Joachim Gaehde; Adolf Gesierich, and Ingrid Loeschcke, all of Berlin, Germany, assignors to Akademie der Wissenschaften der DDR, Berlin-Adlershof, Germany

Continuation-in-part of Ser. No. 514,702, Oct. 15, 1974, abandoned. This application Mar. 10, 1975, Ser. No. 556,770

Claims priority, application Germany, Oct. 25, 1973, 174378

Int. Cl.² B32B 5/18; B37B 15/08

U.S. Cl. 428—313 8 Claims

1. A metallized article consisting essentially of a polymeric substrate, a non-tacky, milky, opaque poromeric polymer adhesive coating selected from the group consisting of polyurethane, polyethyleneterephthalate, and polyvinyl formal, said poromeric adhesive coating prepared by the method of depositing from a solution or dispersion thereof, coagulating in an atmosphere above 40 percent humidity and at a temperature of about 23°–30° C, washing with water and subsequently drying at temperatures above 50° C, and a top metal coating securely bound thereto by means of said poromeric adhesive.

4,005,239

DECORATIVE LAMINATED PANEL AND PROCESS FOR PREPARING THE SAME

Walter Thomas Davis, and Peter Bernard Kelly, both of Cincinnati, Ohio, assignors to Formica Corporation, Cincinnati, Ohio

Continuation of Ser. No. 306,973, Nov. 15, 1972, abandoned. This application Feb. 3, 1975, Ser. No. 546,479

Int. Cl.² B32B 3/26

U.S. Cl. 428—315 4 Claims

1. A decorative laminate foam panel comprising a heat and pressure consolidated decorative laminate adhesively bonded to a compressible, flexible, closed-cell, polypropylene plastic foam sheet by means of a uniform layer of an elastomeric adhesive wherein said heat and pressure consolidated decorative laminate is comprised of a plurality of paper core sheets impregnated with a thermosetting phenolic resin and surfaced with a decorative sheet which is impregnated with a noble thermosetting resin, each of said resins having been converted to the thermoset state during heat and pressure consolidation and wherein said foam sheet is bonded to the back flat surface of said laminate, the decorative side of said laminate is on the reverse side of said back surface and the back most surface of said panel is coated with a uniform layer of an elastomeric adhesive.

4,005,240

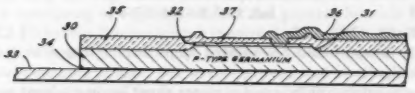
GERMANIUM DEVICE PASSIVATION

Michael M. Schlacter, Irvine, Calif., assignor to Aeronutronic Ford Corporation, Blue Bell, Pa.

Filed Mar. 10, 1975, Ser. No. 556,719

Int. Cl.² C23C 11/00; H01L 23/00, 31/02

U.S. Cl. 428—333 6 Claims



1. A germanium semiconductor device with a passivating coating comprising a mixture of silicon dioxide and phosphorous pentoxide in direct, intimate contact with the surface of said germanium semiconductor device, said coating being formed by a low temperature, high rate vapor plating process and containing between about 4 percent and about 8 percent phosphorous by weight.

4,005,241

METAL PLATED POLYMERIC ARTICLE

Francis J. O'Neill, Springfield, Mass., assignor to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 301,448, Oct. 27, 1972, abandoned. This application Feb. 7, 1975, Ser. No. 547,889

Int. Cl.² B32B 25/16, 15/06, 15/08

U.S. Cl. 428—335 5 Claims

1. A metal plated article of manufacture which exhibits low smoke evolution under flaming conditions which article comprises a molded thermoplastic article having a metal plated exterior surface wherein the metal plating is approximately 2 mils thick and wherein the metal used is selected from the group consisting of nickel, copper and chromium and wherein the thermoplastic article is molded from a polyblend composition comprising:

A. a polymer of a monovinylidene aromatic monomer and an ethylenically unsaturated nitrile monomer wherein the ethylenically unsaturated nitrile monomer moiety constitutes from 20% to about 70% by weight of the polymer;

B. from 15 to 40% by weight, based on the total weight of the polyblend, of a crosslinked polychloroprene rubber having a Mooney viscosity of at least 200 (MS-2½ min., 212° F.), which is grafted with:

1. at least one monovinylidene aromatic monomer; and

2. an ethylenically unsaturated nitrile monomer;

wherein the ethylenically unsaturated nitrile monomer moiety constitutes from 20% to about 70% by weight of the grafted polymer; wherein the percent graft of aromatic monomer and nitrile monomer onto the polychloroprene rubber is in the range of from 10 to 100% by weight, based on the weight of the polychloroprene rubber;

C. from 5 to 10% by weight, based on the total weight of the polyblend of an inorganic compound selected from the group consisting of Sb_2O_3, Bi_2O_3, MoO_3, SnO_2, WO_3, and mixtures of the same; and

D. from 0.5 to 5.0% by weight of a butadiene rubber said butadiene rubber being grafted with

1. at least one monovinylidene aromatic monomer, and

2. an ethylenically unsaturated nitrile monomer,

wherein the total amount of polymer formed from the vinylidene aromatic monomer and the unsaturated nitrile monomer in the polyblend composition is in the range of from 45 to 84% by weight, based on the total weight of the polyblend.

4,005,242

MAGNETIC RECORDING MEDIUM CONTAINING LUBRICANTS

Helmut Kopke, Ludwigshafen; Hans-Joerg Hartmann, Freinsheim; Dieter Mayer, and Herbert Motz, both of Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Dec. 23, 1974, Ser. No. 536,008

Claims priority, application Germany, Dec. 28, 1973, 2364879

Int. Cl.² C08G 77/42; H01F 1/26

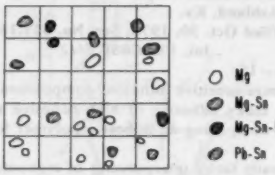
U.S. Cl. 428—425 6 Claims

1. A magnetic recording medium comprising a non-magnetic base material and a magnetic coating applied thereon in the form of a dispersion, containing a lubricant, of a finely divided magnetic pigment in a polymeric binder, wherein the lubricant in the magnetic coating is a block copolymer containing alkyl-, aryl- or aralkyl-siloxane units which contain from about 1 to 8 carbons per alkyl, aryl or aralkyl radical and alkyleneoxy units of 2 to 4 carbon atoms, the alkyleneoxy units being bonded to the polysiloxane radical through a Si—O—C or Si—C group.

4,005,243
FREELY MACHINABLE ALUMINUM ALLOY

Yoshio Baba, and Akira Takashima, both of Nagoya, Japan, assignors to Sumitomo Light Metal Industries, Ltd., Tokyo, Japan

Filed July 18, 1975, Ser. No. 597,374
Claims priority, application Germany, Dec. 2, 1974, 2456866
Int. Cl.² B32B *15/04*
U.S. Cl. 428—469 8 Claims



1. An aluminum base alloy of free machinability and of corrosion resistance, consisting essentially of: from 0.6 to 1.2 weight percent magnesium, from 1.2 to 2.4 weight percent of the sum of tin and lead, wherein the weight quantity of tin exceeds that of lead; from 0.5 to 0.8 weight percent silicon; from 0.1 to 0.4 weight percent copper; and the balance essentially aluminum and inevitable impurities.

2. An aluminum base alloy according to claim 1 further containing chromium in an amount from 0.05 to 0.3 weight percent.

7. A product made of an aluminum base alloy according to claim 2 with a portion thereof being anodically oxidized, coated with resinous paint thereon and cured at an elevated temperature higher than 160° C.

4,005,244
ULTRAVIOLET LIGHT CURABLE OPACIFYING COMPOSITIONS

Marco Wismer, Gibsonia; Paul J. Prucnal, Monroeville, and Kenneth E. Miller, Natrona Heights, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Sept. 30, 1974, Ser. No. 510,187
Int. Cl.² B05D *3/06*
U.S. Cl. 428—480 33 Claims

1. An ultraviolet light curable coating composition which is transmissive of visible and ultraviolet light and which upon curing produces opaque coatings having a Kubelka-Munk scattering coefficient greater than or equal to 0.1 reciprocal mil at 560 nanometers, said ultraviolet light curable coating composition consisting essentially of a mixture of:

a. a first component which shrinks upon curing and which is one or more organic ultraviolet light curable polymers;

b. a second component, which is substantially miscible with said first component at room temperature before said first component is gelled and which is not significantly ultraviolet light curable, selected from the group consisting of organic plasticizers, organic thermoplastic polymers and mixtures thereof; and

c. a photoinitiator which under the influence of ultraviolet light produces free radicals,

wherein

d. said first component and said second component undergo phase separation as said first component gels under the influence of ultraviolet light; and

e. dendritic microfractures appear at phase boundaries under the influence of ultraviolet light, heat or both ultraviolet light and heat, which dendritic microfractures function as light scattering sites to thereby provide opacity to cured coatings of said ultraviolet light curable coating composition.

18. A method comprising:

a. coating a substrate with an ultraviolet light curable coating composition consisting essentially of a visible and ultraviolet light transmissive mixture of:

1. a first component which shrinks upon curing and which is one or more organic ultraviolet light curable polymers;

2. a second component, which is substantially miscible with said first component at room temperature before said first component is gelled and which is not significantly ultraviolet light curable, selected from the group consisting of organic plasticizers and organic thermoplastic polymers; and

3. a photoinitiator which under the influence of ultraviolet light produces free radicals;

b. exposing said coated substrate to ultraviolet light to gel said first component and to cause said first component and said second component to undergo phase separation; then

c. exposing said coated substrate to ultraviolet light, heat or both ultraviolet light and heat to cure said first component and to produce dendritic microfractures at phase boundaries, which dendritic microfractures function as light scattering sites to thereby provide opacity to the thusly cured coating of said ultraviolet light curable coating composition, said cured coating having a Kubelka-Munk scattering coefficient greater than or equal to 0.1 reciprocal mil at 560 nanometers.

24. An article comprising a substrate having a cured coating thereon, said coating:

a. comprising at least two organic phases

1. one organic phase being one or more cured organic ultraviolet light curable polymers,

2. the other organic phase being selected from the group consisting of organic plasticizers which are not significantly ultraviolet light curable, organic thermoplastic polymers which are not significantly ultraviolet light curable and mixtures thereof,

3. both of said organic phases being transmissive of visible light;

b. containing dendritic microfractures at phase boundaries, which dentritic microfractures function as light scattering sites to thereby provide opacity to said coating; and

c. having a Kubelka-Munk scattering coefficient greater than or equal to 0.1 reciprocal mil at 560 nanometers.

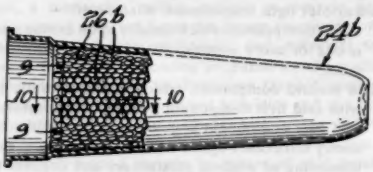
4,005,245
TAPERED PLASTIC PREFORM FOR TELESCOPIC APPLICATION

Bryant Edwards, Clarendon Hills, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Continuation-in-part of Ser. No. 268,710, July 3, 1972, abandoned. This application Apr. 15, 1975, Ser. No. 568,228
Int. Cl.² B32B *9/04*; B65D *1/00*
U.S. Cl. 428—542 9 Claims

1. A plastic preform for telescopic application onto a complementary smooth surfaced heated mandrel in a plastic molding machine for re-shaping the preform under heat and applied differential air pressure, said preform comprising an elongate hollow thermoplastic member the inner surface of which in the aggregate conforms generally with the shape defined by the peripheral surface of said smooth surfaced mandrel, said elongate hollow thermoplastic member being

longitudinally tapered from an open end to a closed opposite end, said inner surface of said hollow thermoplastic member being formed between an axially extending rim portion and said closed opposite end as a plurality of uniformly spaced-apart surface portions engageable in a heat conducting relationship with said peripheral surface of said mandrel upon close telescopic application thereto, the inner surface of said axially extending rim portion of said hollow thermoplastic member being substantially circumferentially smooth to cooperate in an air sealing relationship with the surface of said mandrel upon close telescopic application thereto, the spaces



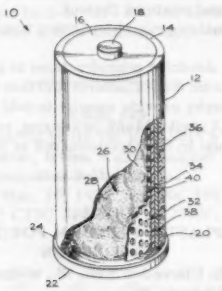
between said spaced-apart surface portions forming substantially uniformly distributed and interconnected air passageways over substantially the entire inner surface of said hollow thermoplastic member between said axially extending rim portion and said closed opposite end for uniform air evacuation from between the inner peripheral surface of said hollow thermoplastic member below said axially extending rim portion and the smooth peripheral surface of said mandrel upon close telescopic application thereto and with uniform heat conducting engagement of said spaced-apart surface portions with said peripheral surface of said mandrel.

4,005,246

RESERVE-TYPE CELL

Stephen F. Schiffer, Waterford, and Renato DiPasquale, New Milford, both of Conn., assignors to Yardney Electric Corporation, Pawcatuck, Conn.

Filed Feb. 20, 1973, Ser. No. 333,992
Int. Cl.² H01M 6/30
U.S. Cl. 429—94 **9 Claims**



1. An improved reserve-type electrochemical cell, said cell comprising, in combination:

a. a pair of closely spaced electrodes;

b. a thin inert separator disposed between said electrodes;

c. electrolyte storage means comprising a storage space containing bibulous material disposed behind and in direct contact with one of said electrodes along the length thereof and out of contact with the other of said electrodes; and

d. dry electrolyte disposed on said bibulous material, said one electrode in contact with said storage means containing said electrolyte being porous, whereby electrolyte in said storage means when dissolved is freely and directly transferable in liquid form through said one electrode into contact with the other of said electrodes along the length hereof for activation and maintenance of activity of said cell.

4,005,247

PRESSURE SENSITIVE ADHESIVE COMPOSITIONS

Curtis Michael Graham, Columbus, Ohio, assignor to Ashland Oil, Inc., Ashland, Ky.

Filed Oct. 30, 1975, Ser. No. 627,165
Int. Cl.² C08F 8/42
U.S. Cl. 526—15 **23 Claims**

1. A pressure-sensitive adhesive composition which when dry forms a tacky adhesive of high cohesive strength, said composition comprising an adhesive polymer formed by the reaction of

A. a normally tacky interpolymer of monomers consisting essentially

1. at least 40 percent by weight of one or more alkyl acrylates having up to about 18 carbon atoms in the alkyl group,

2. at least about 0.2% of an $\alpha - \beta$ unsaturated acid anhydride

3. up to about 59.8 percent of one or more copolymerizable monomers containing an ethylenically unsaturated linkage as the only reaction functional group, said copolymerizable monomers having no more than 25 carbon atoms in the molecule; and

B. a metal alkoxide having the formula $R_nT(OR_1)_z$ wherein T is a metal selected from the group consisting of Groups II, III, IV, and V of the Periodic Table, R is selected from the group consisting of alkyl radicals of from 1 to 8 carbon atoms and aryl radicals of from 6 to 16 carbon atoms, R_1 is selected from the group consisting of aliphatic and substituted aliphatic radicals containing from 1 to 18 carbon atoms, n is an integer whose value is 0 or greater and z is an integer whose value is at least 2 wherein the sum of $n + z$ is greater than 1 and is equal to the valence of the metal represented by T.

4,005,248

SMOKE-INHIBITED POLYMER COMPOSITIONS

David Francis Lawson, Akron, and Jung Wong Kang, Clinton, both of Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio

Filed June 10, 1975, Ser. No. 585,553
Int. Cl.² C08F 8/42, 8/44, 12/08, 212/08
U.S. Cl. 526—20 **9 Claims**

1. Smoke-inhibited combustible composition containing polymeric materials having a backbone or network containing repeating aromatic units, either incorporated in the backbone or network or pendant to the backbone or network, at least a portion of said aromatic units being complexed with chromium tricarbonyl so as to form π-phenyl chromium tricarbonyl units, in which composition the chromium content is chemically bonded to said aromatic units, and is 0.4 to 10 percent of the weight of the polymeric material, as determined by IR analysis.

4,005,249

POLYMERIZATION OF VINYL CHLORIDE

Harold E. Peterson, Lambertville, Mich., and Philip P. Rathke, Toledo, Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

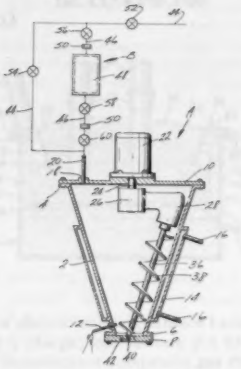
Filed Feb. 15, 1972, Ser. No. 226,417
Int. Cl.² C08F 14/06
U.S. Cl. 526—60 **9 Claims**

1. A dual temperature process for the bulk polymerization of vinyl chloride to obtain vinyl chloride polymers substantially in the form of a powder which comprises:

a. contacting vinyl chloride and an initiator in the absence

of high turbulence at a first temperature of about room temperature to about 110° F until a conversion of approximately 0.1 to 10 percent by weight is obtained, and

b. thereafter raising the temperature to about 120° to about



150° F and carrying out the polymerization reaction to at least about 65% conversion;

with the proviso that at least step (b) is carried out under conditions of mild agitation and low turbulence sufficient to ensure complete mixing of the reaction mixture.

4,005,250

LOW MOLECULAR WEIGHT COPOLYMERS

Richard William Greiner, Newark, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed Feb. 26, 1975, Ser. No. 553,373

Int. Cl.² C08F *222/02, 222/06*

U.S. Cl. 526—204 **7 Claims**

1. A copolymer having a weight average molecular weight of from about 500 to about 6000 derived by free radical polymerization of a vinyl ester and maleic anhydride in the presence of a chain transfer agent selected from the group consisting of dioxane and tetrahydrofuran.

4,005,251

PROCESS FOR PREPARATION OF ALKALI CELLULOSE ESTER SULFATES

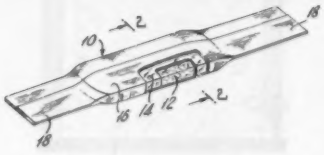
Deger C. Tunc, East Brunswick, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.

Division of Ser. No. 431,455, Jan. 7, 1974, Pat. No. 3,897,782.

This application Feb. 20, 1975, Ser. No. 551,570

Int. Cl.² C08B *7/00*

U.S. Cl. 536—59 **7 Claims**



1. A process for the preparation of alkali cellulose ester sulfates having a degree of sulfate substitution of from about 0.1 to about 0.45 and a degree of acyl substitution of from 1.63 to 2.69 which comprises:

a. slurrying the cellulose in an inert organic liquid;

b. sulfating the cellulose by reacting the cellulosic slurry with a sulfating mixture comprising an alkali acetyl sulfate;

c. esterifying the sulfated cellulose in a reaction mixture comprising said inert organic liquid, said sulfated cellulose, and an acylating agent; and

d. precipitating said alkali cellulose ester sulfate by combining said reaction mixture with an aqueous precipitation medium maintained at a pH of from about 3 to about 8.

4,005,252

APPARATUS FOR GAS COLLECTION IN OPEN ELECTRIC SMELTING FURNACES

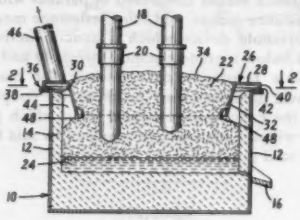
Harald Krogsrud, Gjettum, Norway, assignor to Elkem-Spigerverket, Oslo, Norway

Filed Sept. 17, 1975, Ser. No. 614,160

The portion of the term of this patent subsequent to July 15, 1992, has been disclaimed.

Int. Cl.² F27D 3/00

U.S. Cl. 13—33 4 Claims



1. In an open electric smelting furnace having a furnace pot for containing a charge, said furnace pot having an annular side wall, the improvement comprising gas collecting apparatus, said gas collecting apparatus comprising:

a. an annular top member spaced from the top of the said annular side wall;

b. sealing means for sealing the space between the said annular member and the top of the said annular side wall, said sealing means comprising a granular material;

c. a sloped wall spaced inwardly from the said annular side wall, said sloped wall being affixed to said annular member;

d. said sloped wall being of sufficient length to extend into the charge when the charge is at its normal operating height;

e. means for moving said sloped wall in an annular direction; and

f. means on the sloped wall effective to move the charge towards the center of the furnace pot when the sloped wall is moved in annular direction.

4,005,253

GRADE-LEVEL ENCLOSURE FOR ELECTRICAL APPARATUS

Gerald W. Walter, 1326 S. 52nd Terrace, Kansas City, Kans. 66106

Filed May 14, 1975, Ser. No. 577,229

Int. Cl.² H02G 9/10; E02D 29/14; E04H 5/06

U.S. Cl. 174—37 7 Claims

1. A grade-level enclosure for electrical or other apparatus comprising:

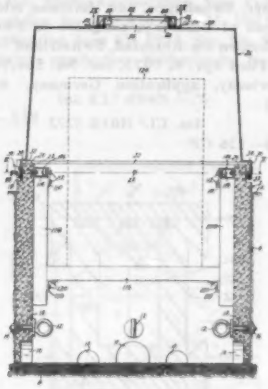
a. an open-topped box adapted to be embedded in the ground with its upper end extending above ground level,

b. support means carried by said box and operable to support electrical apparatus disposed within said box and extending above the top thereof,

c. a cover of waterproof, electrical insulating material having the form of an open-bottomed box adapted to cover said box and the apparatus contained therein, said cover having a horizontal configuration at its bottom generally corresponding to the horizontal configuration of said box at its top, the lower portion of said cover, when closed, surrounding and enclosing the upper portion of said box with a horizontal spacing therebetween, and

d. securing means fastening the bottom of said cover securely but releasably to the top of said box, said securing means comprising:

1. a pair of hinges securing the lower edge of one side of said cover pivotally to the upper edge of the corresponding side of said box, for pivotal movement in a vertical plane, each of said hinges comprising a hinge plate affixed to said box and including a horizontal cylindrical hinge barrel, a second hinge plate affixed to said cover, and a hinge pin affixed to said second hinge plate and being slidably and rotatably inserted into said hinge barrel, the pin being detachable from said barrel only by horizontal movement of said cover relative to



said box, whereby to detach said cover from said box, by a distance greater than the horizontal-spacing between the box and the lower edge portion of said cover, whereby said cover cannot be detached from said box when said cover is closed, and

2. a locking device operable to secure the lower edge of the opposite side of said cover releasably to the upper edge of the opposite sides of said box.

4,005,254

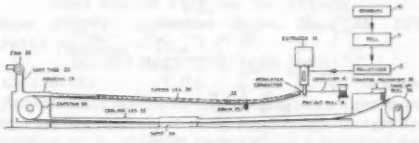
PRESSURELESS CURE SYSTEM FOR CHEMICALLY CROSS-LINKING ETHYLENE CONTAINING POLYMERS, AND PRODUCT FORMED THEREBY

Burton Thornley MacKenzie, Jr., Monroe, Conn., assignor to General Electric Company, New York, N.Y.

Division of Ser. No. 518,384, Oct. 29, 1974, Pat. No. 3,946,099, which is a division of Ser. No. 305,544, Nov. 10, 1972, Pat. No. 3,859,247, which is a continuation-in-part of Ser. No. 91,357, Nov. 20, 1970, abandoned, which is a continuation-in-part of Ser. No. 748,816, July 30, 1968, abandoned. This application Nov. 5, 1975, Ser. No. 629,055

Int. Cl.² B32B 5/16, 27/20

U.S. Cl. 174—110 PM 2 Claims



1. An electrical cable with a relatively dense and substantially non-porous cured insulation composition comprising a conductor and a layer of insulation overlying said conductor, said cured insulation composition comprising the cured product of; (a) an ethylene containing polymer, (b) a curing agent, and (c) a mineral filler treated with about 0.15 to 4.0 percent of tetramethyltetravinylcyclotetrasiloxane by weight of the filler, and which has been cured by heating at about atmo-

spheric pressure in an non-aqueous heat transfer medium to a temperature and for a dwell time sufficient to cure substantially in situ the ethylene containing polymer to relatively dense and substantially non-porous cured filled polymer insulation composition about the conductor.

4,005,255

EXTRUDED COMPOSITE SECTION

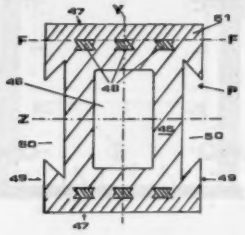
Alfred Wagner, Steisslingen, and Hermann Kidratschky, Hilzingen, both of Germany, assignors to Swiss Aluminium Ltd., Neuhausen am Rheinfall, Switzerland

Filed Apr. 4, 1975, Ser. No. 564,998

Claims priority, application Germany, Apr. 8, 1974, 7412358[U]

Int. Cl.² H01B 5/02

U.S. Cl. 174—126 CP **8 Claims**



1. An extruded composite section, suitable for use as an electrical conductor,

comprising, in combination:

a longitudinal body composed of an aluminum alloy; and

at least one insert having non-circular cross section and being composed of a substance having a greater strength and wear-resistance than said aluminum alloy; said insert being disposed in said body with its periphery entirely surrounded by said aluminum alloy and extending throughout at least a major portion of the length of said body;

said insert having a cross section for engaging said body securely.

4,005,256

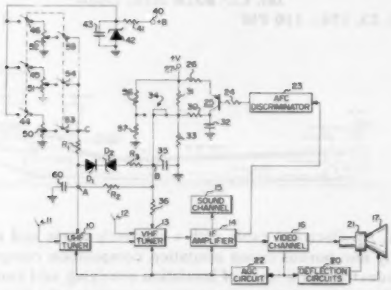
AFC CIRCUIT

Rangaswamy Arumugham, Batavia, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Nov. 3, 1975, Ser. No. 628,072

Int. Cl.² H04B 1/16

U.S. Cl. 358—195 **6 Claims**



1. In a television receiver having a voltage controlled radio frequency tuning means, bias means for providing one of a plurality of bias voltages each of which correspond to a particular television channel to be received, and automatic frequency control means for providing an error voltage, a signal combining circuit comprising:

first resistance means connecting said bias means to an input of said tuning means for coupling the bias voltage to said input;

second resistance means connecting said automatic frequency control means to said input of said tuning means for coupling a predetermined portion of the error voltage to said input; and

third resistance means connected in parallel with said second resistance means, said third resistance means including a threshold device which is nonconductive for bias voltages below a predetermined threshold and which has a dynamic resistance characteristic for bias voltages above said predetermined threshold, for coupling a portion of the error voltage to said input which portion increases with the bias voltage provided by said bias means beyond said predetermined bias voltage.

4,005,257

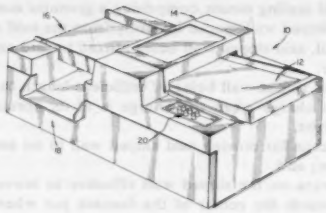
FACSIMILE TRANSCEIVER

Robert E. Krallinger, New Milford; Vladimir Ignatjev, Norwalk; Ralph K. Rand, New Milford, and Matthew Joseph Costello, Bethel, all of Conn., assignors to Graphic Sciences, Inc., Danbury, Conn.

Filed May 5, 1975, Ser. No. 574,709

Int. Cl.² H04N 1/02

U.S. Cl. 358—256 **44 Claims**



1. A facsimile transceiver comprising a transmitter arranged to feed a first document in substantially straight line motion from a document store, through a scanner, into a first receiving tray, and a receiver positioned beneath said first tray and arranged to feed paper on which a document is to be reproduced from a paper store, through a writing head, into a second receiving tray in a direction transverse to the direction in which said first document is fed.

4,005,258

ULTRASONIC EXAMINATION

Jacques Dory, Meaux, France, assignor to Realization Ultrasoniques, France

Filed Nov. 26, 1974, Ser. No. 527,199

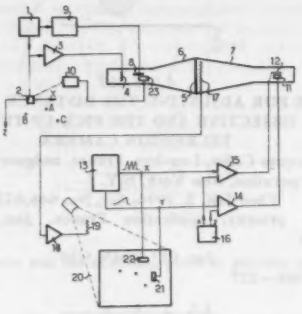
Claims priority, application France, Nov. 26, 1973, 73.42026

Int. Cl.² H04N 7/18

U.S. Cl. 358—112 **4 Claims**

1. In a device for examination of an object by ultransonic pulses, said device including a transmitter of recurrent electric pulses, a transmitting-receiving ultrasonic transducer energized by this transmitter and subjected to a linear displacement, a receiver of reflected pulses coupled to said transducer, a recording tube coupled to said receiver and having a memory target, a writing electron beam with an horizontal and a vertical scan and a reading electron beam, means for synchronizing said horizontal scan with the displacement of the transducer and for synchronizing the said vertical scan with

the repetition rate of the transmitted pulses, a television scan generator supplying scan signals which control the scanning of the memory target by the reading electron beam, and a display tube controlled by said scan generator and modulated by the reading signal supplied by the recording tube, the improvement which consists in that the said device further comprises



a function generator supplying further scan signals and means coupled to said function generator for modulating the scanning of the memory target by the reading electron beam by means of the said further scan signals, thereby to move the reading electron beam along successive curve portions arranged on a plurality of horizontal scanning lines.

4,005,259

SIGNAL REPRODUCING SYSTEMS EMPLOYING A SEMICONDUCTIVE LIGHT SOURCE

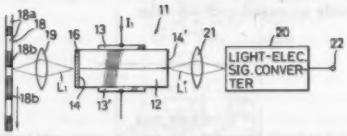
Takeo Kaneko, Yokohama, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Feb. 4, 1975, Ser. No. 546,996

Claims priority, application Japan, Feb. 12, 1974, 49-17017

Int. Cl.² G11B 7/00; H01S 3/10

U.S. Cl. 358—128 **12 Claims**



1. An information reproducing system comprising: a record medium having the information recorded thereon as reflective and non-reflective portions of the record medium; and a pickup device including a semiconductor PN junction diode having opposed side surfaces crossing the plane of said PN junction and at least one of which is non-reflective, means for supplying a bias current to said diode to cause the latter to radiate light from said PN junction, said diode being positioned in respect to said record medium so that light radiated from said PN junction is guided through said one non-reflective side surface to impinge selectively on said reflective and non-reflective portions of the record medium with the light, when reflected by said reflective portions of the record medium, reentering said diode through said one non-reflective side surface, said reflective and non-reflective portions of the record medium having respective reflectivities to cause resonance of said diode and the emission of laser light through the other of said opposed side surfaces only when light impinges on said reflective portions of the record medium, whereby to effect the ON-OFF control of the emission of said laser light in response to the selective impingement of the radiated light on said reflective and non-reflective portions, respectively, of the record mediun, and means receiving said laser light emitted through said other side surface of the diode for converting the same to the recorded information.

4,005,260

DEVICE FOR READING A DISK-SHAPED RECORD CARRIER WITH TIME BASE CORRECTION

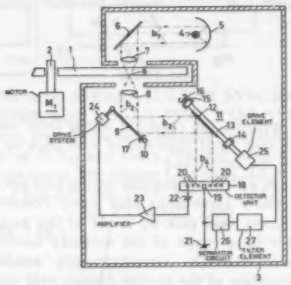
Peter Johannes Michiel Janssen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 409,420, Oct. 25, 1973, abandoned. This application June 17, 1975, Ser. No. 587,636

Claims priority, application Netherlands, Nov. 11, 1972, 7215306

Int. Cl.² H04N 5/76

U.S. Cl. 358—128 **5 Claims**



1. Apparatus for reading a rotating disc-shaped record carrier on which signals including a synchronizing signal are stored in tangentially arranged tracks, comprising read unit means for scanning the tracks of the record carrier, signal controlled means for tangentially moving the scanning of the read unit means with respect to the record carrier, a read detector means for converting the scanned stored signals into an electrical signal, filter element means for deriving the recorded synchronizing signal from the electrical signal, as a control signal, and means connecting said control signal to said signal controlled means, the read unit means, signal controlled means, read detection means, filter means and connecting means comprising a single loop servo control system, said control system having a band-pass characteristic wherein the frequency corresponding to the speed of the record carrier is proximate the peak of said pass-band.

4,005,261

METHOD AND AFPARATUS FOR PRODUCING A COMPOSITE STILL PICTURE OF A MOVING OBJECT IN SUCCESSIVE POSITIONS

Hiroki Sato, Yokohama, and Hiroh Takahashi, Fujisawa, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Nov. 20, 1975, Ser. No. 633,686

Claims priority, application Japan, Nov. 26, 1974, 49-136551

Int. Cl.² H04N 7/18; A63B 69/00

U.S. Cl. 358—83 **4 Claims**

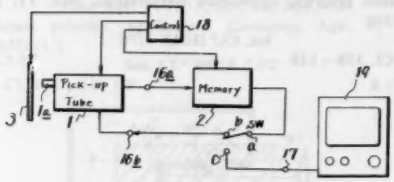
3. Apparatus for producing a composite video signal representing a moving object in an initial position and changes from said position of the object at intervals over a period of time, comprising:

shutter means having an open condition and a closed condition;

storage-type image pick-up means shielded by said shutter means in said closed condition of the latter and including an input terminal and an output terminal, said pick-up means having a storage mode for storing a signal applied to said input terminal and an image pick-up mode for picking-up an image of the object through said shutter

means in the open condition of the latter and producing a corresponding video signal from which any signal previously stored in said pick-up means is subtracted for providing a resultant video signal at said output terminal;

memory means connected with said output terminal of the pick-up means and having a writing mode in which a video signal appearing at said output terminal is stored in said memory means in superposed relation to any signal previously stored in said memory means, and a read-out mode in which the signal stored in said memory means is read-out therefrom;



means for applying the read-out signal from said memory means to said input terminal of said pick-up means for storage in the latter; and

control means which, at intervals during said period of time, simultaneously establishes said open condition of the shutter means, said pick-up mode of the pick-up means and said writing mode of the memory means, and, between said intervals, simultaneously establishes said closed condition of the shutter means, said storage mode of the pick-up means and said read-out mode of the memory means.

4,005,262

BRIGHTNESS AND CONTRAST CONTROL FOR TELEVISION RECEIVER

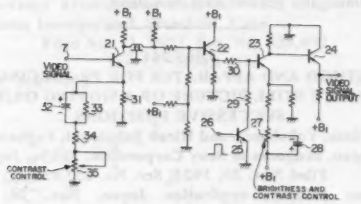
Seiji Fijisawa, Ikoma; Norio Meki, Takatsuki, and Hiroyuki Irie, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 375,921, July 2, 1973, abandoned. This application July 21, 1975, Ser. No. 597,332

Claims priority, application Japan, June 30, 1972, 47-66141; June 30, 1972, 47-66142

Int. Cl.² H04N *5/58*

U.S. Cl. 358—168 **8 Claims**



1. A television receiver of the type including an automatic gain control circuit having a video amplifier circuit provided with means for simultaneously varying both brightness and contrast and means for varying contrast alone, wherein said means for simultaneously varying both brightness and contrast comprises a circuit for combining a video signal and a blanking pulse signal having the same polarity as a sync signal of the video signal and having an ampiitude within the range from 3 to 6 times as large as that of the video signal, a first transistor receiving at a base thereof an output of said combining circuit and producing at a collector thereof an output signal, and a picture control circuit having a variable resistor and a capacitor, said picture control circuit being connected to an emitter of said first transistor for controlling an a-c signal gain, and wherein said means for varying contrast alone comprises a second transistor for amplifying the video signal and a means for varying the amplification degree of an amplifier circuit constituted by said second transistor, an output of said second transistor being applied as a video signal to said combining circuit.

4,005,263

DEVICE FOR ADJUSTING THE DISTANCE BETWEEN THE OBJECTIVE AND THE PICK-UP TUBE IN A TELEVISION CAMERA

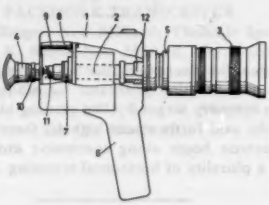
Pierre Jacques Collet, Louviers, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 2, 1976, Ser. No. 646,023

Claims priority, application France, Jan. 14, 1975, 75.00955

Int. Cl.² H04N *5/26*

U.S. Cl. 358—227 **10 Claims**



1. A television camera comprising an objective, a pick-up tube and a device for adjusting a distance between the objective and the pick-up tube, the said device comprising a displacement mechanism, including a return mechanism, for the longitudinal displacement of the pick-up tube, characterized in that the displacement mechanism comprises a fixed ring which at least partly encloses the pick-up tube, an abutment piece, and an adjusting member, the abutment piece being arranged between the said adjusting member and the pick-up tube, the return mechanism comprising a resilient member which is arranged between the rigidly arranged objective and the movably arranged pick-up tube.

4,005,264

ARRANGEMENT FOR SCANNING A DISC-SHAPED TYPE CARRIER

Rolf Humbs, and Robert Weinke, both of Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed July 8, 1975, Ser. No. 594,044

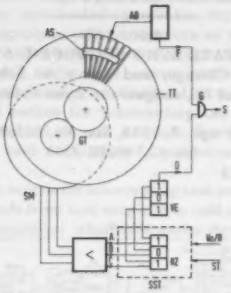
Claims priority, application Germany, Sept. 6, 1974, 2442688

Int. Cl.³ H04L *15/34;* **G06K** *15/06*

U.S. Cl. 178—34 **5 Claims**

1. In an arrangement for scanning a disc-shaped type carrier in a code controlled printing device having a stepping motor which is controllable in the forward and backward directions for setting the type carrier, the improvement comprising: a stepping motor control including a repetitively stepped ring counter for producing a sequence of binary combinations connected to the stepping motor and defining angular positions of the type carrier, a comparator connected to said ring counter for producing an output signal in response to receipt of a binary combination assigned to a specific character, a scanning sector on the type carrier extending over a plurality of type characters including the specific character, a scanning device for producing a scanning pulse in response to rotation

of the scanning sector to a point in proximity to the scanning device and means for conjunctively linking the output pulse of



the comparator and the scanning pulse to provide a synchronizing pulse.

4,005,265

VIDEOPHONE SYSTEM SYNCHRONIZER

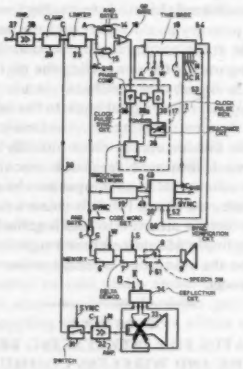
Nicolaas Alphonsus Maria Verhoeckx, Emmasingel; Herman van der Hoff, Hilversum; Cornelis Henricus Johannes Vos, and Johannes Wilhelmus Coenders, both of Emmasingel, all of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 382,897, July 26, 1973, abandoned, which is a continuation of Ser. No. 195,321, Nov. 3, 1971, abandoned. This application Dec. 19, 1974, Ser. No. 535,044

Claims priority, application Netherlands, Nov. 13, 1970, 7016628

Int. Cl.² H04N 5/10

U.S. Cl. 358—145 **9 Claims**



1. A transmitter comprising means for transmitting in analog form a line and field scanned video signal requiring three synchronization signals at a receiver for proper display; means for transmitting only two of said synchronization signals comprising a clock pulse generator means coupled to said transmitting means for generating clock pulses having a frequency from which field and line frequencies are derivable and a code word generator coupled to said transmitting means for generating at least one field code word phase synchronized with said clock pulses during the field flyback period; whereby at said receiver line and field synchronizing signals can easily be extracted from said clock frequency for display of said video signal.

8. A receiver for composite signal having a line and field scanned analog video component and a synchronization component having only two synchronization signals said synchronization signals respectively comprising a digital clock pulse component having a frequency from which field and line frequencies are derivable, and a digital field code word component phase synchronized with said clock pulse component during the field flyback period; said receiver comprising code word detector means adapted to receive said transmitted code words and for supplying same; a clock pulse generator means; means coupled to said clock generator for synchronizing said generator; a frequency divider coupled to said clock generator for providing at least the line and field synchronization signals from said clock pulses; and a synchronization verification means having inputs coupled to said code word detector and said divider respectively; and an output means coupled to a reset input of said divider for resetting said divider to obtain phase equality between said detected and transmitted code word.

4,005,266

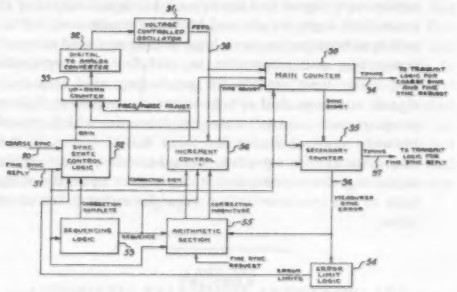
METHOD AND APPARATUS FOR SYNCHRONIZING MASTER AND LOCAL TIME BASE SYSTEMS

Stanley Lehr, New Rochelle; Philmore Coralnick, Spring Valley, both of N.Y., and Gary William Blauth, Glen Ridge, N.J., assignors to The Singer Company, Little Falls, N.J.

Filed July 14, 1975, Ser. No. 595,629

Int. Cl.² H04L 7/00

U.S. Cl. 178—69.1 **15 Claims**



1. A time base synchronization system for synchronizing a local time base consisting of a cyclically recurring series of sequential time slots generated by a voltage controlled local oscillator and local digital main counter with a master time base consisting of a cyclically recurring series of sequential time slots generated by a master oscillator and master main digital counter comprising coarse sycnhronizing means for bringing said time bases into coarse synchronization, said coarse synchronizing means comprising

means coupled to the master main counter for generating a coarse synchronization signal at the beginning of the first time slot in said series of time slots in the master time base, and

means coupled to the local main counter and responsive to said coarse synchronization signal for adjusting the local main counter to begin generating the said first time slot in the series of slots in the local time base upon receipt of said coarse signal; and

fine synchronizing means for bringing said time bases into fine synchronization, said fine synchronizing means comprising

means coupled to the local main counter for generating a fine synchronization request signal at the start of a predetermined one of the remaining time slots in the local time base,

means including a master secondary counter coupled to the master main counter for measuring the elapsed time between the receipt of said fine synchronization request

signal by the master main counter and the beginning of said predetermined one time slot in the master time base and for generating a fine synchronization reply signal at the beginning of a time period before the end of said predetermined one slot in the master time base which is equal to said elaspsed time,

means including a local secondary counter coupled to the local main counter for measuring the elapsed time between the receipt of said fine synchronization reply signal by the local and the end of said predetermined one time slot in the local time base to produce a digital synchronization error signal,

means for computing from said digital synchronization error signal a frequency error, time error and phase error,

means for coupling said frequency and phase errors as corrections to said local oscillator and said time error as a correction to said local main counter,

synchronization state logic means obtaining as inputs said coarse synchronization signal and fine synchronization reply signal for generating a time varying gain output in dependence on the number of cycles of said time slots between error corrections, said gain outputs coupled respectively to said local oscillator and said local main counter to control the gain at which said correction signals are entered thereto,

error limit logic means coupled to said synchronization error measuring means for producing error limit signals when said error exceeds a predetermined range of values, and

sequencing logic means having as inputs said fine synchronization reply signal and the error limit signal output of said error limit logic means and having outputs coupled to to said synchronization state logic means and said means for computing and responsive to said fine synchronization and error limit signals for producing said sequencing signals to cause said synchronization system to follow a programmed control state sequence in which transfer between control states for large initial errors is made automatically for a predetermined number of sequentially occurring corrections and is dependent upon the magnitude of the synchronization error for subsequent corrections.

4,005,267

ARRANGEMENT FOR CONVERTING OSCILLATIONS IN HEADPHONES

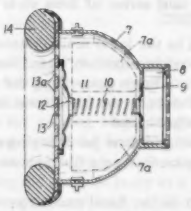
Rudolf Görike; Ernst Pless, both of Vienna; Werner Fidi, Baden, and Alexander Fritz, Vienna, all of Austria, assignors to AKG Akustische u. Kino-Gerate Gesellschaft m.b.H., Austria

Filed May 12, 1975, Ser. No. 576,431

Claims priority, application Austria, May 17, 1974, 4123/74; June 14, 1974, 4931/74; Mar. 28, 1975, 2412/75

Int. Cl.² H03H *9/30*

U.S. Cl. 179—1 J **26 Claims**



1. An arrangement for headphones for converting frequency modulated audio oscillations into amplitude modulated oscillations, particularly for rendering audible the vibrato of electronic musical instruments, such as electronic organs, comprising a housing, an electroacoustic transducer in said housing having a diaphragm with smooth frequency response zones, and at least one mechanical transit-time member having a transit time from one end to the other not greater than 20 ms connected to said diaphragm.

4,005,268

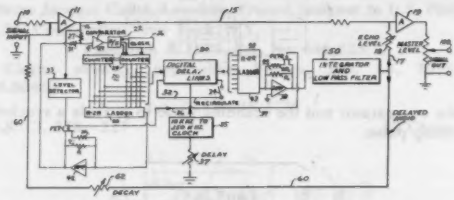
SOLID STATE ECHO PRODUCING SYSTEM

George Canell, Chicago, and Larry A. Schotz, Arlington Heights, both of Ill., assignors to Lynn Industries, Chicago, Ill.

Filed Apr. 7, 1975, Ser. No. 565,802

Int. Cl.² H04R *3/00*

U.S. Cl. 179—1 J **4 Claims**



1. An electronic signal echo producing system for producing and coupling a delayed secondary signal echoing a primary audio signal comprising, in combination, input means for receiving audio signals as an analog signal, output means, transmission means for transmitting the input signals received by said input means as a primary audio signal to said output means, analog to digital signal converting means coupled to said transmission means for producing from the input signal transmitted thereby a secondary signal in digital data format, signal delay means coupled to said signal converting means for receiving the secondary input signal in digital format and selectively actuable to delay the transmission of the digital format signals, first digital to analog signal converting means coupled to said signal delay means for converting the secondary signals transmitted thereto into analog format, means for combining the primary audio signal and the secondary signal in analog format at the output means, second digital to analog signal converting means for converting the digital data into an analog reference signal, and feedback circuit means for coupling said analog reference signal back to the input of said first analog to digital converting means, electronic switch means, signal amplitude divider means electronically connectible by said switch means into said feedback circuit means, level detector means connected to said input means and operable in response to a selected signal level to cause said switch means to connect said divider means into said feedback circuit means causing the amplitude of said reference signal to be divided to thereby improve the resolution of said system when operating at low signal levels.

4,005,269

APPARATUS FOR INTERFACING BETWEEN TELEPHONE AND WIRELESS COMMUNICATION SYSTEMS

Hilda Willis, Los Altos, Calif., assignor to Harry H. Hicks, Jr., San Mateo, Calif.

Filed Jan. 6, 1975, Ser. No. 538,796

Int. Cl.² H04M *11/00*

U.S. Cl. 179—2 C **8 Claims**

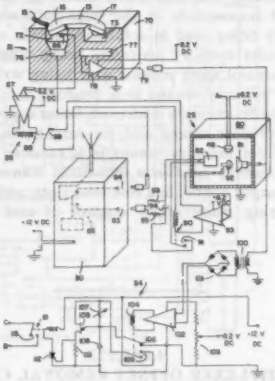
1. In apparatus for interfacing between a telephone instrument of a conventional telephone network and a conventional wireless communication system including at least one voice actuated transceiver having an audio signal input means and an audio signal output means, which apparatus includes

a. electromechanical control means removably mounted on said telephone instrument for simulating the removal and return of the handset of said telephone instrument from and to the cradle thereof, respectively;

b. audio transducer means receiving the mouthpiece and earpiece of said handset of said telephone instrument, said audio transducer means being adapted to acoustically insulate said mouthpiece and said earpiece from each other and including speaker means for applying acoustic signals to said mouthpiece as well as means for detecting and amplifying audio signals present at said earpiece and audio signal sensor means for sensing the application of said acoustic signal to said mouthpiece;

c. electrical means for transmitting the amplified audio signals detected at said earpiece from said transducer means to said audio signal input means of said transceiver;

d. voice loop means for interrupting said means transmitting audio signals from said earpiece to said audio signal input of said transceiver when said audio signal sensor means



senses the application of said acoustic signals to said mouthpiece; and

e. answering means for sensing the ringing of said telephone instrument by said telephone network and actuating said control means to simulate the removal of said handset of said telephone instrument from the cradle thereof;

the improvement comprising audio mixing means in addition to said audio transducer means and interposed in said means for transmitting said amplified audio signals detected at said earpiece from said transducer to said audio signal input means of said transceiver, said audio mixing means including a hollow acoustic chamber and a speaker within said chamber for acoustically reproducing said amplified audio signal whereby a conventional microphone coupled to said audio signal input means of said transceiver may be located within said chamber for acoustic coupling to said speaker within said chamber.

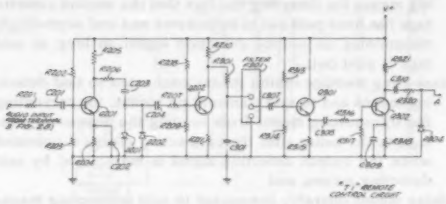
4,005,270

REMOTE CONTROL FOR OPERATING A TELEPHONE ANSWERING SYSTEM FROM A REMOTE POINT OVER THE TELEPHONE LINE

James R. Darwood, Cerritos, Calif., assignor to T.A.D. Avanti, Inc., Paramount, Calif.

Filed May 29, 1975, Ser. No. 581,842
Int. Cl.² H04M 1/64
U.S. Cl. 179—6 E **4 Claims**

1. In a telephone answering system which responds to a ring signal received over a telephone line to transmit a recorded announcement over the telephone line to a calling party, in which the recorded announcement is recorded on a loop magnetic member having electromagnetic transducing means magnetically coupled thereto for recording announcements in the magnetic member and for playing back announcements previously recorded on the magnetic member, switching means controlled by said magnetic member to be actuated to a particular state when the magnetic member is moved from a reference position and to remain actuated in said particular state for the duration of a T-1 operating cycle and until the magnetic member returns to the reference position, and which includes a drive system for controlling the movement of the magnetic member, and audio amplifying circuit means; the combination of: a switching circuit for selectively connecting said audio amplifying circuit means to the telephone line and to the transducing means to cause the announcement recorded on the magnetic member to be transmitted over the telephone line in one operating condition of the switching



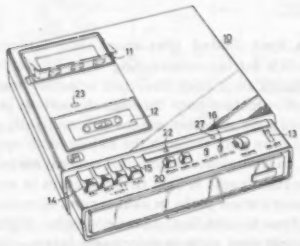
circuit and to cause a new announcement from the telephone line to be recorded on the magnetic member in a second operating condition of the switching circuit; a tone sensing circuit coupled to the telephone line for sensing a tone signal of a predetermined frequency received over the telephone line and for providing a control signal in response thereto; a first control circuit coupled to said tone sensing circuit and to said switching means and responsive to said control signal to switch said switching circuit from said first condition to said second condition only while said switching means is actuated to said particular state during said T-1 operating cycle; and an inhibit control circuit interposed between said first control circuit and said switching circuit to prevent switching of said switching circuit to said second condition until the completion of a first T-1 operating cycle.

4,005,271

AUTOMATIC TELEPHONE ANSWERING AND RECORDING APPARATUS

Yuji Urayama, Yokohama, Japan, assignor to Victor Company of Japan, Limited, Yokohama, Japan

Continuation of Ser. No. 389,596, Aug. 20, 1973, abandoned. This application May 5, 1975, Ser. No. 574,411
Claims priority, application Japan, Aug. 23, 1972, 47-83705; Aug. 26, 1972, 47-84984; Sept. 8, 1972, 47-89544
Int. Cl.² H04M 1/64
U.S. Cl. 179—6 R **4 Claims**



1. An automatic telephone answering and recording apparatus comprising:

a first cassette tape recorded previously with an answering message;

answering means connected to a telephone line and operable automatically in response to a call arriving over the telephone line from a caller when the called person is absent for actuating reproducing means for play back of the answering message of the first cassette tape and for actuating connecting means for connecting to the line a transmitting means for sending said message through the telephone line toward the caller;

a second cassette tape having a still unrecorded portion;

caller's message recording means which is adapted to operate after the completion of the operation of said answering means for recording on the second cassette tape a message arriving from the caller through the telephone line;

detecting means connected to said caller's message recording means for detecting the fact that the second cassette tape has been paid out to its extreme end and accordingly maintaining an output detection signal so long as said tape is paid out;

answering message inhibit means connected to said detecting means and to said transmitting means, for preventing the transmitting means from sending the answering message to the caller after the connecting means is operated when the output detecting signal is maintained by said detecting means; and

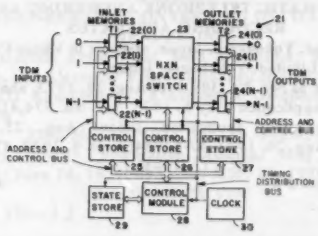
delay means operably connected to said connecting means and to said detecting means, for operating only when the output detection signal from said detecting means is being maintained, and adapted when a call arrives, to increase the period of time required for actuation of said connecting means over the time normally required, said answering message inhibit means preventing said answering message from being transmitted after said connecting means is actuated with delay through said delay means.

4,005,272

TIME FOLDED TST (TIME SPACE TIME) SWITCH

Arthur A. Collins; Robert D. Pedersen, and John C. Bellamy, II, all of Dallas, Tex., assignors to Arthur A. Collins, Inc., Dallas, Tex.

Filed Aug. 14, 1974, Ser. No. 497,214
Int. Cl.² H04J 3/00
U.S. Cl. 179—15 AQ **4 Claims**



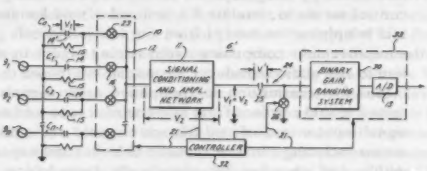
1. In a time folded time-space-time telecommunication system switch for interconnecting digital time division multiplex communication lines: first path selection means establishing a communication path through the switch in a first direction; second path selection means automatically establishing a communication path through the switch in an opposite second direction; communication time slot control means establishing communication paths in said first direction in even time slots, and communication paths in said second direction, symmetrically, relative to said first direction paths, during respective following odd time slots in selectively interconnecting digital bi-directional time division multiplexed tranmission paths; and including space switch staging means with control memory means associated with output link means of said space switch staging means; said control memory means being the specifying selective control means acting through control decoding circuitry means for selectively connecting space switch staging input links to said output links during successive time slot channel times; and including, switch clock means; input time staging with inlet data memory means; output time staging with outlet data memory means; and with said inlet data memory control means being structured to write data from the inlet link time slots in sequential inlet data memory locations in synchronism with the input connecting link time slots, and to read data randomly in response to read addresses supplied through connecting circuitry from inlet data control store means; and with said outlet data memory control means being structured to write data randomly into outlet data memory means with addresses being supplied through connective circuitry from outlet data memory control store means, and said outlet data memory word locations being read sequentially in synchronism with the output connecting link time slots; with data from the input link time slots being written sequentially into said inlet data memory means in synchronism with the input connecting link time slots, and with the data, having been stored sequentially in the inlet data memory means, subsequently being read in a random access mode with the successive inlet memory addresses being supplied from the inlet data control store means; data being written into said outlet data memory means in a random access mode with successive outlet memory addresses being supplied from said outlet control store means; and, for data, having been written into said outlet memory means in a random access mode, being subsequently read in a sequential manner in synchronism with output connecting link time slots; and with the data transfers being made under control of said switch clock means.

4,005,273

MULTIPLEXER OFFSET REMOVAL CIRCUIT

Lee E. Siems, Houston, Tex., assignor to Western Geophysical Company of America, Houston, Tex.

Filed Mar. 8, 1976, Ser. No. 664,615
Int. Cl.² H04J 3/04
U.S. Cl. 179—15 BL **8 Claims**



1. An analog-to-digital signal acquisition system comprising:

a plurality of input channels;

a multiplexer having a plurality of inputs and a common output bus;

a capacitor connected between each of said input channels and one of said multiplexer inputs, each said capacitor having a spurious voltage developed thereacross;

means for connecting one of said input channels to ground;

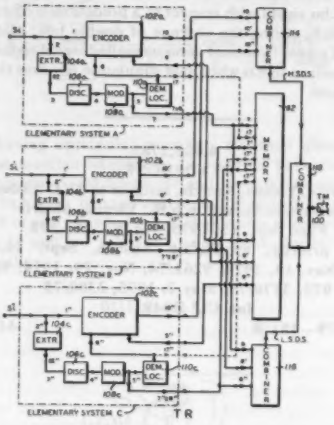
circuit means including an amplifier for connecting said multiplexer bus to a utilization device; and

a sample-and-hold circuit connected between said circuit means and said utilization device, said sample-and-hold circuit means comprising a shunt switch and a series capacitor for developing a sample voltage thereacross equal and of opposite polarity to said spurious voltage each time that the grounded input channel is scanned by said multiplexer and said shunt switch is closed, whereby in use, the sample voltage will successively cancel out the spurious voltages from said signal-receiving channels, as the multiplexer scans the signal-receiving channels.

4,005,274
PULSE-CODE MODULATION COMMUNICATION SYSTEM

Federico Vagliani, Milan, and Alicide Molinari, Vimercate, both of Italy, assignors to TELETTRA-Laboratori di Telefonia Elettronica e Radio S.p.A., Milan, Italy

Filed May 27, 1975, Ser. No. 580,914
Claims priority, application Italy, May 27, 1974, 23193/74
Int. Cl.² H04J 3/18; H04B 1/66
U.S. Cl. 179—15.55 R 14 Claims

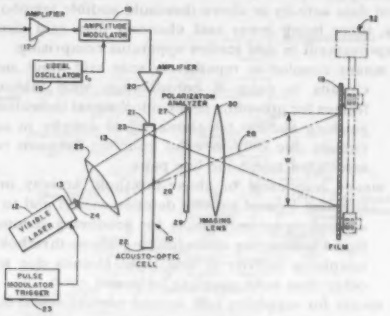


1. A system for reducing the redundancy of pulse code modulation encoded signals subjected to either compression or expansion comprising: means for transmitting and reducing redundancy of said signals, said transmitting means comprising encoding means for receiving an input speech signal having a variable modulation envelope signal associated with at least one particular talker and encoding said input signal with one of *m* variable compression laws; second means connected to receive said input signal for extracting said envelope signal to provide an extracted signal; means connected to said extracting means for receiving said extracted signal and for discriminating said extracted signal and assigning it to one volume slot out of *n* possible volume slots, said volume slot corresponding to the volume state of said envelope signal; digital modulation means for encoding said assigned volume slot envelope signal connected to said discriminating means output; means connected to said modulation means output for demodulating said assigned volume slot envelope signal for providing said variable compression law to said encoding means for accomplishing said encoding in accordance with said provided variable compression law and for providing a variable number of bits per sample that vary in accordance with the value of said specific input envelope signal and said volume state of all speech channels processed by said system, said encoding means output signal being a high speed digital signal, said digital modulation means further providing a low speed digital output signal for enabling subsequent reconstructing of said volume states, first combiner means connected in parallel to said digital modulation means output and said encoder means output for combining said high and low speed digital signals for transmitting said reduced redundancy pulse code modulation encoded signals.

4,005,275
WIDEBAND ANALOG PHOTORECORDING APPARATUS AND METHOD

Richard A. Coppock, San Jose, Calif., assignor to GTE Sylvania Incorporated, Mountain View, Calif.

Continuation-in-part of Ser. No. 528,807, Dec. 2, 1974, abandoned. This application Oct. 20, 1975, Ser. No. 623,797
Int. Cl.² G11B 7/00; G02B 21/18; G11C 13/04
U.S. Cl. 179—100.3 G 7 Claims



5. A method of real time recording of electrical signals consisting of the steps of

converting the electrical signal into an analogous acoustic wave in a transparent Bragg cell,

generating an intermittently pulsed laser beam,

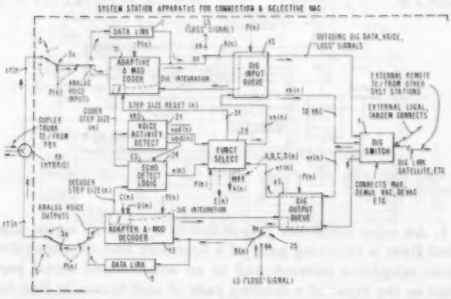
directing said intermittently pulsed laser beam through said cell in a direction transversely of the direction of acoustic wave propagation therein to produce a pulsed output diffracted light beam, and

moving an optical recording medium transversely of said output beam so as to intercept and record same in successive lines at the rate of one line for each laser beam pulse.

4,005,276
DIGITAL VOICE SIGNALING WITH DIGITAL ECHO DETECTION AND VOICE ACTIVITY COMPRESSION USED TO CANCEL ECHO

Paul Abramson, Raleigh, N.C., and Ulrich Appel, Munich, Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 20, 1975, Ser. No. 560,423
Int. Cl.² H04B 3/20
U.S. Cl. 179—170.2 12 Claims



1. In a multiplex digital communication system for mixed handling of data and telephone information between switching stations, said system including station apparatus for connectively processing digital signals representing digital data and audible telephone information between internal circuits of the station and multiplex channels linked to remote stations said circuits comprising multiple input and output circuits asso-

ciated in pairs with respective pairs of space-separated sending and receiving lines served by said apparatus, said apparatus including threshold activity detection means coupled to said input circuits for detecting telephone information signals representing audible telephone activity exceeding a threshold and including multiplex digital switch channel assignment means for assigning subsets of said circuit selectively to be connected with said channels in repetitive multiplex frames of recurrence of said channels, by assigning said channels connectively only to input curcuits handling signals which represent data activity or above-threshold audible telephone activity, there being fewer said channels than said circuits, the improvement in said station apparatus comprising:

means coupled to repetitively scan said input and output circuits in pairs in coordination with said multiplex frames for providing first control signal indications distinguishing audible telephone signal activity in said input circuits due only to echo coupling between respective associated telephone line pairs;

means responsive to above-threshold activity indications supplied by said activity detction means and to said first control signal indications for producing second control signal indications distinguishing above-threshold audible telephone activity in said input circuits due to sources other than echo coupling only; and

means for supplying said second control signal indications to said digital switch means, in time and space association with signals representing samples of respective input activity, for use in determining said channel assignments; whereby samples of telephone activity in said input circuits due only to echo coupling in associated lines may be indirectly suppressed by non-assignments of channels to carry said samples.

4,005,277

ECHO CONTROLLER COMPRISING A MODE SWITCH FOR SWITCHING ECHO SUPPRESSOR AND CANCELLER

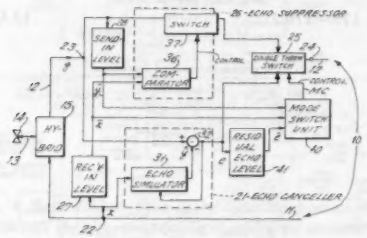
Takashi Araseki; Kazuo Ochiai; Takashi Ogihara, and Shunji Tanaka, all of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Sept. 4, 1975, Ser. No. 610,372

Claims priority, application Japan, Sept. 5, 1974, 49-102794

Int. Cl.² H04B *3/20*

U.S. Cl. 179—170.2 **5 Claims**



1. An echo controller responsive to a received signal supplied from a receiving path of a four-wire line of a long-distance telephone network and to an unprocessed signal supplied to the input of a sending path of said four-wire line for supplying said sending path with a transmitted signal substantially free from an echo signal inevitably produced by an echo path formed at a jucntion of said four-wire line and a two-wire line of said network, said echo controller comprising:

a self-adaptive echo canceller which comprises an adjustable echo simulator responsive to said received signal for producing an echo simulation signal simulating said echo signal, a subtractor for substracting said echo simulation signal from said unprocessed signal to produce an echo cancelled signal, and means responsive to said echo cancelled signals for adjusting said echo simulator during the absence of double talk in said four-wire line to improve simulation by said echo simulation signal of said echo signal;

an echo suppressor comprising a comparator for comparing levels of said received and unprocessed signals for producing a switching signal when the former is higher than the latter and means responsive to said switching signal for producing said unprocessed signal as an echo suppressed signal; and

mode switch means responsive to levels of said received, unprocessed, and echo cancelled signals for detecting the absence of double talk and evaluating the simulation of said echo signal with respect to a predetermined criterion to switch, during the absence of double talk, said transmitted signal from said echo cancelled signal to said echo suppression signal when said simulation is worse than said criterion.

4,005,278

HEADPHONE

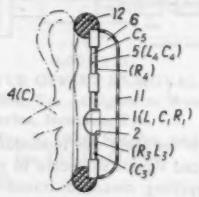
Rudolf Görike, Vienna, Austria, assignor to AKG Akustische u. Kino-Gerate Gesellschaft m.b.H., Vienna, Austria

Filed Sept. 15, 1975, Ser. No. 613,578

Claims priority, application Austria, Sept. 16, 1974, 7454/74; Nov. 19, 1974, 9261/74; Nov. 29, 1974, 9593/74; Apr. 24, 1975, 3170/75; May 2, 1975, 3380/75

Int. Cl.² H04R *1/20*

U.S. Cl. 179—181 R **44 Claims**



1. In a headphone of the type comprising a toroidal seal ring which, in the operational position of the headphone, rests against or surrounds the user's ear, is constituted by a soft, yielding, and elastic material, and, with the headphone positioned on the head of the user, forms a coupling space between an active diaphragm, actuated by an electroacoustic transducer, and the auditory canal of the user's ear, and which coupling space is substantially sealed from the exterior of the headphone, the improvement comprising, in combination, said coupling space being formed with at least one opening; a respective passive oscillatory diaphragm, having a definite self-resonance, mounted in each opening and associated with a sound path leading therefrom and providing, with the associated passive diaphragm, an optimum frequency characteristic.

4,005,279

LOCKABLE COVER FOR PUSH BUTTON TELEPHONES

Julian Richter, 8500 Biscayne Blvd., Miami, Fla. 33138

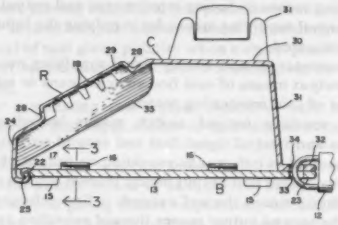
Filed May 24, 1976, Ser. No. 689,669

Int. Cl.² H04M *1/66*

U.S. Cl. 179—189 D **1 Claim**

1. A lockable cover device for push button telephones comprising a base member, means adapted to removably secure said base member to the base of said telephone, a cover member adapted to be mounted over a front, top and rear walls of said telephone, said cover member having a raised portion for receiving and enshrouding the push buttons,

means pivotally attaching said cover member to said base member along a front edge thereof, said pivotal means consisting of an open slotted portion having an arcuate cross sectional configuration along a cooperating edge of said cover member and an arcuate member of similar cross sectional shape on said front edge of said base member and slidably positioned in said slotted portion, said removable securing



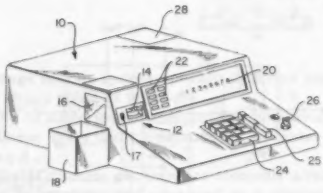
means having upstanding members mounted along sides of said base member adapted to be inserted between the base and side walls of said telephone and shoulder means mounted on the free ends of said upstanding members engaging the base wall of said telephone and tab portions mounted on a side opposite to said one side and locking means for securing said tabs together.

4,005,280

TICKET READER

Napoleone Nunzio, Worcester, and Donald James Musgrave, Woodville, both of Mass., assignors to Dennison Manufacturing Company, Framingham, Mass.

Filed Apr. 10, 1975, Ser. No. 566,735
Int. Cl.² G06K *13/08*
U.S. Cl. 235—61.11 R **13 Claims**



1. A ticket reader comprising

a carrier that is movable between loading, reading and eject positions;

means for locating a ticket on said carrier;

means for reading information encoded on said ticket and converting it to output signals when the carrier is in said reading position;

means for locking the carrier in said reading position and biasing it for movement to the eject position when the lock is released; and

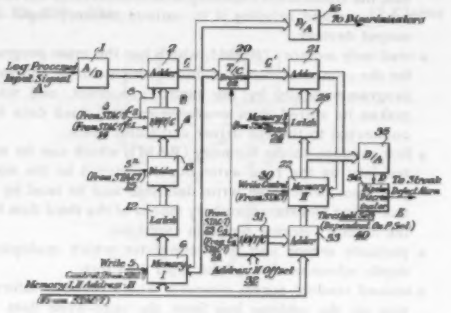
means for ejecting the ticket from the carrier, said eject position coinciding with said loading position and said carrier being pivotal from said reading position to said eject position.

4,005,281

DEFECT IDENTIFICATION WITH NORMALIZING OF GAIN FUNCTION IN OPTICAL-ELECTRICAL INSPECTION

Mark Edwin Faulhaber, and Edmund Haislett Smith, Jr., both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 14, 1975, Ser. No. 577,394
Int. Cl.² G06F *15/00*
U.S. Cl. 235—151.3 **12 Claims**



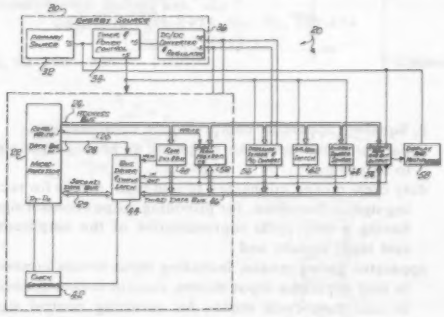
4. Apparatus for defect identification with normalizing of the optical-electrical inspection system gain function of scans across a full width of a running product web comprising, in electrical circuit in the sequence recited, a source of electrical scan signals A, a memory storing a sufficient accumulation of a number of said signals A to permit the resolution of an acceptable average reference signal R, means computing said average signal R as the quotient of said accumulation of said number of said signals A divided by said number of said signals A accumulated, means computing the difference signal A-R for succeeding scan signals A, thereby effectively equalizing each successive scan signal A while preserving defect-related signals, and means identifying said defect-related signals by amplitude discrimination of said difference signal A-R.

4,005,282

DECOMETER

Kirk E. Jennings, Kaneohe, Hawaii, assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 25, 1975, Ser. No. 616,786
Int. Cl.² G06F *15/42*
U.S. Cl. 235—151.3 **8 Claims**



1. A portable decompression computer, which is capable of providing a diver's current depth and safe ascent depth, comprising:

a source of energy, for energizing and timing various components of the computer;

a micro processor, energized by the energy source, connected to an address bus, a read-write bus, a data bus in, and a second dated bus;

a clock generator for timing various components of the computer;

a bus driver and status latch, timed by the clock generator and connected by the data bus in and the second data bus to the micro processor, which decodes data signals received from the micro processor and converts them to compatible voltage levels for the second and a third data bus, the status latch decoding information from the micro processor and relaying it to various memory input and output devices;

a read-only memory (ROM), which has the main programs for the computer stored within it which can be addressed programmatically by the micro processor, and which makes its stored data available on the third data bus, connected to the bus driver and status latch;

a first random-access memory (RAM), which can be written into by the read-write bus connected to the micro processor, which can write data into and be read by the bus driver and status latch by means of the third data bus, the memory storing program variables;

a pressure sensor and A/D converter which multiplexes depth information onto the third data bus;

a second random-access memory, which receives information on the address bus from the read-write data bus regarding the current depth and safe ascent depth and stores it; and

a display and multiplexer which is energized by the source of energy, has as an input from the second random access memory the current depth and safe ascent depth, and receives timing pulses from the source of energy, the function of the display and multiplexer being to decode the address of the digit selected and determine the time on, or duty cycle, of each digit.

4,005,283

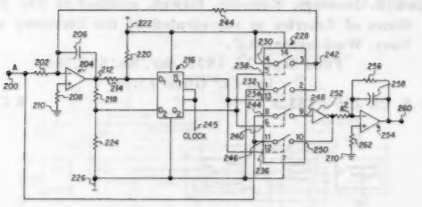
SQUARING CIRCUIT APPARATUS

Melvin H. Rhodes, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Sept. 22, 1975, Ser. No. 615,753

Int. Cl.² G06G *7/16, 7/20*

U.S. Cl. 235—194 **3 Claims**



1. Squaring apparatus comprising, in combination:

apparatus input means for supplying an analog input signal to be squared;

duty cycle means, connected to said input means for receiving signals therefrom, for providing output control signals having a duty cycle representative of the amplitude of said input signals; and

apparatus gating means, including input means connected to said apparatus input means, control means connected to said duty cycle means for receiving control signals therefrom and first and second output means, for supplying output signals from one of said first and second output means in accordance with the polarity of said analog input signal and representative in amplitude of the square of said input signal, wherein said duty cycle means is a converter including,

first switch means including first and second gating means each having an input means, an output means and a control means for controlling a conductive path between said input means and said output means of the gating means,

first and second feedback signal source means connected to said input means of said first and second gating means respectively of said first switch means;

integrating means including input means and output means,

analog signal supplying means for supplying the input signal to be squared,

means connecting said analog signal supplying means and said output means of said first switch means to said input means of said integrating means,

voltage sensitive second switch means including input means and control signal first and second output means, said second switch means providing an output of a given polarity at said first output means thereof when a signal at said input means thereof exceeds a first reference level and the second output means thereof providing an output signal of said given polarity when a signal provided to said input thereof exceeds a second reference level,

means connecting said output means of said integrating means to said input means of said second switch means,

means connecting said control output means of said second switch means to said control means of said first switch means, the output signal from said control output means of said voltage sensitive switch means being representative in duty cycle of the amplitude of signals provided by said analog signal supplying means, and wherein said apparatus gating means includes inverting means connected within said apparatus gating means and to the one of said output means providing output signals with negative polarity analog input signals; and

means connecting an output of said inverting means to the other output means of said apparatus gating means for supplying apparatus output signals whereby the squared apparatus signal is positive regardless of the polarity of said input signal to be squared.

4,005,284

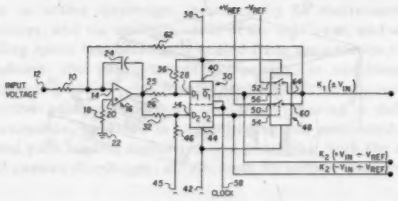
ANALOG SIGNAL TO DUTY CYCLE CONVERSION APPARATUS

Melvin H. Rhodes, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Sept. 22, 1975, Ser. No. 615,758

Int. Cl.² G06G *7/16*

U.S. Cl. 235—194 **5 Claims**



1. Analog to pulse density converting apparatus comprising, in combination:

first switch means including first and second gating means each having an input means, an output means and a control means for controlling a conductive path between said input means and said output means of the gating means;

first and second feedback signal source means connected to said input means of said first and second gating means respectively of said first switch means;

integrating means, including input means and output means;

analog signal supplying means;

means connecting said analog signal supplying means and said output means of said first switch means to said input means of said integrating means for supplying two signals thereto to be integrated;

voltage sensitive second switch means including input means and first and second output means, said second switch means providing a given polarity output at said first output means thereof when a signal at said input means thereof exceeds a first polarity reference level and the second output means thereof providing an output signal of said given polarity when a signal provided to said input means thereof exceeds a second polarity reference level;

means connecting said output means of said integrating means to said input means of said second switch means; and

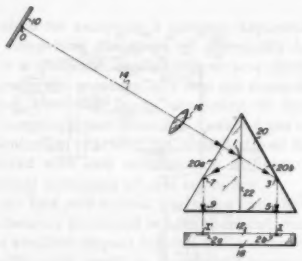
means connecting said first and second output means of said second switch means to said control means of said first and second gating means respectively of said first switch means, the output signal from said first output means of said voltage sensitive switch means being representative in pulse density of the amplitude of positive signals provided by said analog signal supplying means and the output signal at said second output means of said second switch means being representative in pulse density of the amplitude of negative signals supplied by said analog signal supplying means.

4,005,285

OPTICAL SYSTEM FOR EXTENDING PHOTOSENSOR ARRAY RESOLUTION

Edgar E. Price, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 30, 1975, Ser. No. 627,498
Int. Cl.² H01J *39/12*
U.S. Cl. 250—208 **7 Claims**



1. An image sensing system optically disposed relative to a conjugate object plane as follows:

a plurality of discrete photosensor elements arranged in a first linear array and separated by a center-to-center spacing *d* ,

a plurality of discrete photosensor elements arranged in a second linear array and separated by a center-to-center spacing *d*,

said first and second arrays of photosensor elements being disposed in an image plane in optical communication with said conjugate object plane,

a beam splitter disposed in the optical path between said object plane and said image plane,

a reflector disposed in each of the divided optical paths between said beam splitter and said image plane, said reflectors disposed in mutually inward facing relationship at an angle bisected by said beam splitter

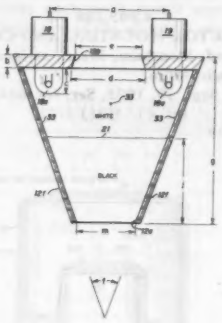
said first and second arrays of photosensor elements being in conjugate relationship to the same object line of said object plane, and being linearly offset relative to each other with respect to said object line by an amount *d*/2 so as to optically double the spatial density of said photosensor elements relative to said object line for increased resolution of image sensing by said elements.

4,005,286

COMPACT ILLUMINATION SYSTEM WITH LIGHT ABSORBING AND REFLECTING WALLS

Hubert D. Faulkner, Irving, Tex., assignor to Recognition Equipment Incorporated, Dallas, Tex.

Continuation of Ser. No. 554,659, March 3, 1975, abandoned. This application Aug. 11, 1976, Ser. No. 713,329
Int. Cl.² H01J *3/14, 5/16, 39/12*
U.S. Cl. 250—216 **11 Claims**



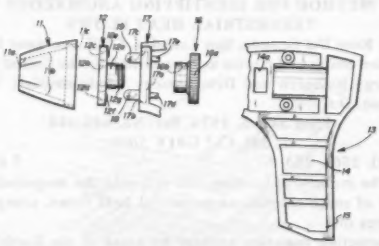
1. A data field illuminator for uniformally brightening a data field viewed by a photo sensor array in an optical character recognition system comprising; an enclosure having side walls converging from an enclosure plate to a first aperture, said enclosure plate enclosing one end of said enclosure and having a second aperture therein for the passage of light to said photo sensor array reflected from a data field in registration with said first aperture, a light absorbing inner surface on two of said side walls extending from the first aperture toward the closure plate to a boundary line located intermediate the first aperture in said closure plate, and a light reflecting surface extending from the boundary line to said closure plate, a light reflecting surface on two other said side walls and a light source supported by said closure plate for illumination of the data field.

4,005,287

NOSE ATTACHMENT FOR OCR WAND

Paul A. Cook, Dallas, Tex., assignor to Recognition Equipment Incorporated, Dallas, Tex.

Filed July 28, 1975, Ser. No. 599,474
Int. Cl.² H01J *5/02*
U.S. Cl. 250—239 **7 Claims**



1. A hand-held wand for an optical reader constructed to accommodate element replacement which comprises:

a. a wand body having a light sensitive array mounted therein on an optical axis for receiving light reflected

from an external data field, and further having illuminating means adjacent to but spaced from said optical axis and facing away from said body to illuminate said field;

b. a nose section having an aperture symmetrical about said optical axis and encompassed by a threaded extension passing into said body from the end of said body facing said field; and

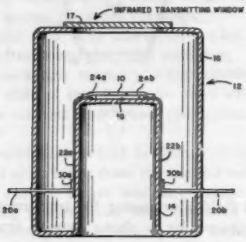
c. a rotatable threaded cap engaging said extension within said body, said cap having a bore therethrough coaxial with said optical axis and said cap having an outer flange thereon extending in a direction transverse to the optical axis and extending through said wand body.

4,005,288

PHOTODETECTOR MOUNTING AND CONNECTING

Gene A. Robillard, Stoneham, Mass., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Sept. 19, 1975, Ser. No. 614,804
Int. Cl.² H01J *5/02*
U.S. Cl. 250—239 **2 Claims**



1. Photodetector apparatus comprising:

photodetector mounting apparatus of the Dewar type having an outer flask and an inner flask having top and side surfaces;

a photodetector mounted on the top surface of the inner flask;

an electrical conductive path comprising an electrically conductive film extending from the side surface on to the top surface of the inner flask; and

an electrical lead tab having a first part attached to the photodetector and a second part projecting from the photodetector and having first and second major surfaces, the second part being attached to the electrical conductive path on the top surface of the inner flask, with the first major surface being essentially parallel to and in electrical contact with a surface of the electrical conductive path.

4,005,289

METHOD FOR IDENTIFYING ANOMALOUS TERRESTRIAL HEAT FLOWS

Nancy Kerr Del Grande, San Leandro, Calif., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Jan. 5, 1976, Ser. No. 646,444
Int. Cl.² G01V *5/00*
U.S. Cl. 250—253 **7 Claims**

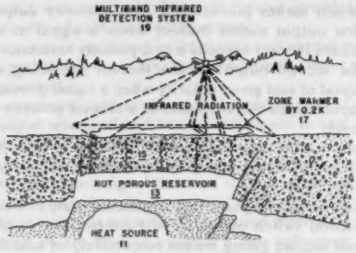
1. The method of locating and mapping the magnitude and extent of small anomalous terrestrial heat flows, comprising the steps of:

a. detecting radiation emitted by areas of the Earth's surface;

b. detecting at least two infrared bands where the spectral radiation is described by Planck's Radiation Law, at periodic intervals, as needed to characterize the spectral, spatial, thermal, temporal, and statistical radiation features of the terrestrial radiation;

c. relating the ratio of at least two infrared bands to the true temperature of the surface terrain;

d. determining the normal surface temperature for the ambient non-thermally modified terrain;



e. locating and mapping areas where the true surface temperature is significantly different from the ambient normal-surface temperature;

f. relating the statistically significant residual temperature difference to a heat flow anomaly;

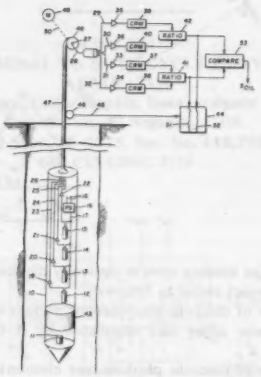
g. determining the magnitude and extent, and mapping the heat flow anomaly.

4,005,290

NEUTRON-NEUTRON LOGGING

Linus S. Allen, Dallas, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed June 25, 1975, Ser. No. 590,362
Int. Cl.² G01V *5/00*
U.S. Cl. 250—266 **6 Claims**



1. A method of logging the formations traversed by a borehole, comprising the steps of:

a. locating a steady-state source of primary radiation within the borehole to irradiate the formations with fast neutrons,

b. at first and second spaced-apart positions within said borehole measuring secondary radiation that represents predominantly the epithermal neutron parameters of the formation being logged,

c. at third and fourth spaced-apart positions within said borehole measuring secondary radiation that represents both the epithermal and the thermal neutron parameters of the formation being logged,

d. producing a first ratio of the secondary radiation measured at said first and second spaced-apart positions, said

first ratio being indicative predominantly of the porosity of the formation being logged,

e. producing a second ratio of the secondary radiation measured at said third and fourth spaced-apart positions, said second ratio being indicative predominantly of both the porosity and the macroscopic absorption cross section of the formation being logged, and

f. determining the differential between said first and second ratios as an indication of the salinity of the formation being logged, said first ratio being unaffected by such salinity and said second ratio increasing and decreasing as such salinity increases and decreases respectively.

4,005,291

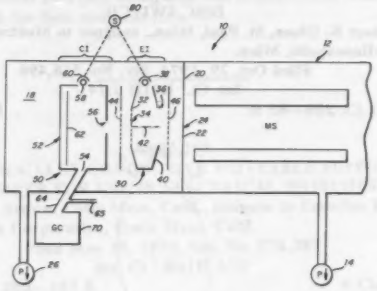
IONIZATION METHOD FOR MASS SPECTROMETRY

Guy P. Arsenault, Lexington, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation-in-part of Ser. No. 215,373, Jan. 4, 1972. This application Sept. 27, 1973, Ser. No. 401,284

Int. Cl.² H01J *39/34*

U.S. Cl. 250—282 **23 Claims**



1. A method for analyzing a gaseous, vaporous or aerosol substance comprising the steps of chemically ionizing said substance in a chemical ionization zone at a chemical ionization pressure in the presence of a first gas comprising at least one selected from the group consisting of hydrogen and charge exchange reactant gases and a second gas comprising a chemical ionization reaction gas, said first and second gases being admixed with said substance in sufficient amount to effect chemical ionization of said substance,

passing the first and second gases and the chemically ionized substance produced in said chemical ionization zone into an electron-impact ionization zone through an aperture sufficiently small to maintain a pressure drop between said zones, said electron-impact ionization zone being maintained at an electron-impact ionization pressure and

obtaining the mass spectra of the ionized substances formed in said chemical ionization zone by passing the output of the electron-impact ionization zone to the input of a mass spectrometer.

4,005,292

MASS COUNTING OF RADIOACTIVITY SAMPLES

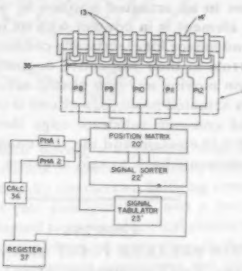
Donald L. Oesterlin, Roselle, and Raymond F. Obrycki, Mount Prospect, both of Ill., assignors to G. D. Searle & Co., Skokie, Ill.

Continuation-in-part of Ser. No. 436,101, Jan. 24, 1974, abandoned. This application May 12, 1975, Ser. No. 576,343

Int. Cl.² G01T *1/00, 1/20*

U.S. Cl. 250—364 **2 Claims**

1. A method of analyzing a plurality of separate samples for the presence of the radioisotope iodine-125 comprising positioning said samples in an array at spaced intervals from each other at predetermined stationary positions proximate to a plurality of separate scintillation crystals having uniform lateral dimensions and contiguously positioned in optical isolation from each other in a planar two dimensional array whereby the spacing of said samples from each other is coordinated with the lateral dimensions of said separate crystals so tat individual ones of said crystals in a one-to-one relationship, viewing said crystals with an array of photodetectors each of which is positioned in overlapping optical communication with at least a plurality of said crystals to generate electrical signals from at least a plurality of photodetectors in response to each scintillation observed in said scintillation crystals to provide positional information concerning each scintillation observed, establishing a plurality of coterminous spatial sectors of the area encompassed in the plane of the aforesaid two dimensional array each such sector corresponding to the location of a single one of the aforesaid crystals, concurrently



tabulating the detection of radioactive events according to the sector of origin within which radioactive events from said samples cause light emissions in said crystals, thereby concurrently registering separately the number of radioactive events detected from each of the aforesaid samples, analyzing said electrical signals from said photodetectors to determine separately the intensities of the observed scintillations, tabulating separately those scintillations generating electrical pulses characteristic of the detection of single radioactive rays emitted by iodine-125 and those scintillations characteristic of the detection of coincident radioactive rays emitted by iodine-125, and calculating therefrom the actual rate of disintegration of atoms of iodine-125 occurring in each of the aforesaid samples.

4,005,293

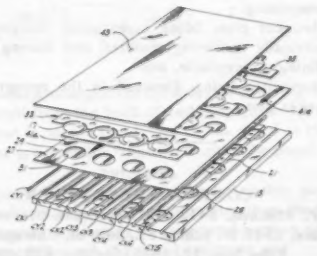
PUSHBUTTON KEYBOARD SWITCH ASSEMBLY HAVING INDIVIDUAL CONCAVE-CONVEX CONTACTS INTEGRALLY ATTACHED TO CONDUCTOR STRIPS

Henry J. Boulanger, Cumberland, R.I., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 29, 1974, Ser. No. 528,180

Int. Cl.² H01H *13/70, 1/06*

U.S. Cl. 200—5 A **17 Claims**



1. A pushbutton keyboard system comprising an electrically insulative substrate, a plurality of actuating elements arranged

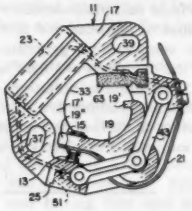
in an array of columns and rows on one face of said substrate, a plurality of conductors on said one face of said substrate, said conductors being parallel to one another and extending in the common direction of said columns to terminate adjacent a common edge of said substrate, there being one conductor for each row of elements constituting a row conductor and another conductor for each column of elements constituting a column conductor, each column conductor extending along the substrate between the substrate and the elements of its respective column and said row conductors extending along the substrate with at least some of the row conductors disposed between said column conductors in spaced relation to adjacent column conductors, each of said elements being of a flexible electrically conductive material and having an initial position in which it is clear of its respective column conductor, each of said elements being resiliently deformable from its initial position to an actuated position in which at least one point on the element is in contact with its respective column conductor, and means for electrically connecting the elements in each said row to their respective common row conductor whereby, upon moving any one of said actuating elements in any row to its actuated position, a circuit is completed extending from said common substrate edge through the column conductor of said element and the row conductor of said row of actuated elements back to said common substrate edge.

4,005,294

IGNITION BREAKER POINT ARRANGEMENT

Elwin J. Brayley, East Longmeadow; Allen L. Brownlee, Westfield, and John C. Garen, West Springfield, all of Mass., assignors to Eltra Corporation, Toledo, Ohio

Filed May 2, 1975, Ser. No. 574,174
Int. Cl.² H01H *19/00*
U.S. Cl. 200—19 A **14 Claims**



1. In a contact breaker assembly including a breaker plate supporting a stationary breaker point thereon and a breaker lever carrying another breaker point and being pivotally supported on the breaker plate for movement into engagement with the stationary breaker point, a capacitor having a pair of electrically conductive plates and means for electrically connecting one of the capacitor plates to the stationary breaker point and electrically connecting the other capacitor plate to the breaker point carried by the breaker lever, the improvement comprising:

said breaker plate being constructed integrally from an electrically insulating material and having wall means defining a receptacle, and

said capacitor being disposed in the receptacle of said breaker plate.

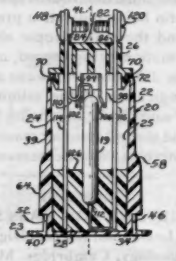
4,005,295

COMPONENT CONTAINER

James P. Mitchell, 5412 W. Henderson St., and Henry J. Lakoma, 5347 W. School St., both of, Chicago, Ill. 60641

Filed Nov. 17, 1975, Ser. No. 632,464
Int. Cl.² H01H *3/16*
U.S. Cl. 200—61.62 **9 Claims**

1. A component container comprising: a vessel portion, said vessel portion having a plurality of rigid tines connected to an outside wall of said vessel portion, said vessel portion holding



an electrical component; and a cap, engaging said vessel portion.

4,005,296

DISC SWITCH

Robert K. Olson, St. Paul, Minn., assignor to Medtronic, Inc., Minneapolis, Minn.

Filed Oct. 29, 1974, Ser. No. 518,496
Int. Cl.² H01H *3/14*
U.S. Cl. 200—85 R **18 Claims**

1. Apparatus adapted for cooperation with the human foot for performing a switching function in response to ambulation comprising:

substrate means;

first and second contact means carried by said substrate means on opposing sides thereof;

first and second flexible contact means; and

means for supporting each of said flexible contact means in a first position spaced from a different one of said first and second contact means while allowing at least a portion of said flexible contact means to flex into a second position in electrical communication with the first or second contact means from which it is spaced.

4,005,297

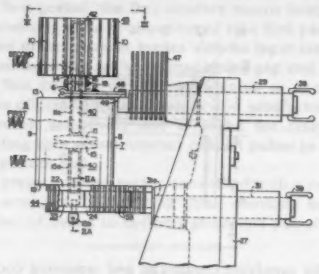
VACUUM-TYPE CIRCUIT INTERRUPTERS HAVING HEAT-DISSIPATING DEVICES ASSOCIATED WITH THE CONTACT STRUCTURES THEREOF

Charles M. Cleaveland, Irwin, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 18, 1972, Ser. No. 298,689
Int. Cl.² H01H *33/66*
U.S. Cl. 200—144 B **3 Claims**

1. A vacuum-type circuit interrupter including means defining an evacuated envelope and a pair of separable contacts disposed therewithin, means for effecting the opening and

closing motions of at least one of said separable contacts, heat-exchanger means disposed within the contact-stem of at least one of said separable contacts, a heat pipe provided in



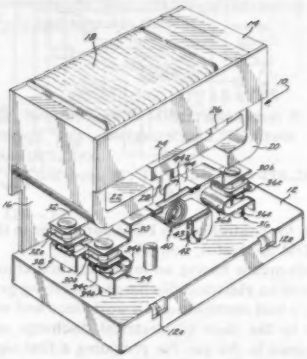
the contact-stem of one of the contacts, and externally-provided finned cooling structure being provided having a core, and a second heat pipe being disposed in end-to-end relationship with the first said heat pipe.

4,005,298

ELECTRICALLY CONDUCTIVE MOVEABLE SUPPORT MEMBER FOR USE IN ELECTRICAL SWITCHES

Jack M. Brown, Costa Mesa, Calif., assignor to Esterline Electronics Corporation, Costa Mesa, Calif.

Filed May 19, 1975, Ser. No. 578,387
Int. Cl.² H01H 3/00
U.S. Cl. 200—153 R **6 Claims**



1. An electrical switch comprising in combination,
a base,
a stationary contact fixed relative to said base,
a moveable contactor having a moveable contact fixed thereto for cooperation with said stationary contact,
motive power means operatively connected to said contactor for moving the latter, and
an elongated strip of electrically conductive material formed with substantially equal right-hand and left-hand convolutions along its length and having one end connected relative to said base and another end connected to said contactor to thereby afford a cantilever member for said contactor during movement of said moveable contact between engaged and disengaged positions with said stationary contact, said cantilever member generating minimum resistance to such movement while conducting electrical energy.

4,005,299

ELECTRICAL CONTACT MEMBER HAVING LOW ELECTRICAL RESISTANCE

Laurence J. Keough, Walpole, Mass., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Apr. 29, 1974, Ser. No. 465,220
Int. Cl.² H04Q 3/00
U.S. Cl. 200—159 B **3 Claims**

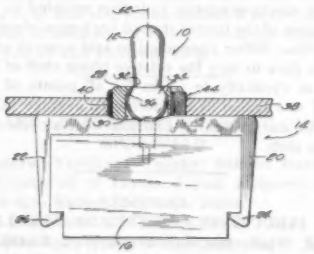
1. In a calculator having a keyboard, a circuit board on which are disposed sets of spaced stationary contact members, snap acting electrically conductive bridging contact elements having a first at rest configuration and a second opposite configuration adapted to make electrical contact between the stationary contact members of a set when in the second configuration, the improvement comprising the disposition of a metal layer having high electrical conductivity on a portion of one surface of the elements, the portion covering an area less than the area of one surface of the elements, the portion so located that it is aligned with the respective stationary contact members, the portion comprising the berm of one side of the disc and an area located centrally within each berm.

4,005,300

PANEL MOUNTED DEVICE INCLUDING PRESS-IN RETENTION MEANS

Earl T. Piber, Oconomowoc, Wis., assignor to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed May 27, 1975, Ser. No. 580,625
Int. Cl.² H01H 9/00
U.S. Cl. 200—296 **5 Claims**



1. A mounting arrangement for a device adapting the device to be mounted from the back of and through an aperture in a support panel to secure the device on the panel so that a part of the device is accessible from the front of the panel comprising
an elongated bushing carrying the accessible part of the device, having an axial length greater than the thickness of the panel and having an outer end portion adapted to be inserted through the panel aperture; and
a retainer mounted on said bushing end portion, said retainer including a supporting material secured to the outer peripheral surface of said bushing end portion and

carrying a plurality of stiff, normally straight fibers having one end secured at spaced locations to said supporting material, each of said fibers extending from the outer surface of said supporting material in a plane generally perpendicular to the outer peripheral surface of said bushing at the location of said secured end and downwardly in a direction away from the outer end of said bushing at an acute angle with the free ends of said fibers normally extending outwardly beyond the inner periphery of the panel aperture, whereby said fibers, upon engagement with the inner wall of the panel aperture, can be deflected inwardly to permit the outer end portion of said bushing to be pressed through the panel aperture and a portion of said fibers thereafter will return to their normally extended position and grip the front of the panel in the area surrounding the panel aperture to lock the device on the panel.

4,005,301

MICROWAVE HEAT TREATING FURNACE

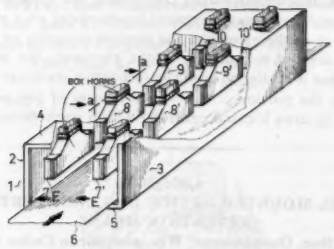
Leo Y. Thourel, Castanet, France, assignor to Agence Nationale de Valorisation de la Recherche (ANVAR), France

Filed June 20, 1975, Ser. No. 588,723

Claims priority, application France, June 21, 1974, 74.21570

Int. Cl.² H05B 9/06

U.S. Cl. 219—10.55 A **13 Claims**



1. Tunnel furnace for microwave frequency heating, comprising, a tunnel-shaped enclosure through which in operation articles to be treated are caused to move in longitudinal direction of the tunnel-shaped structure; paired coherent sources of microwave electromagnetic radiation coupled to develop in cross sections of the tunnel-shaped enclosure electromagnetic fields; a phase shifter connected to said sources and which is variable in time to vary the relative phase shift of said coherent sources cyclically to effect for all points of each cross section of said tunnel-like structure an average value of electromagnetic energy density constant over a cycle of variation of a phase shift.

4,005,302

INDUCTIVELY HEATED DRAWROLL

Felix Graf, Winterthur, and Armin Wirz, Dietlikon, both of Switzerland, assignors to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Oct. 24, 1974, Ser. No. 517,587

Claims priority, application Switzerland, Nov. 2, 1973, 15429/73

Int. Cl.² H05B 5/00, 3/02; D02J 13/00

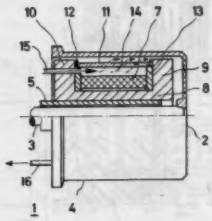
U.S. Cl. 219—10.61 **10 Claims**

1. A heatable drawroll for drawtwisting, draw-winding and spin-draw winding machines comprising

a rotatable jacket,

a stationary inductive heating means mounted inside said jacket for heating said jacket, said heating means including a coolable induction coil,

a sleeve of heat and electrically insulating material stationarily disposed inside said jacket in radially spaced relation to said jacket and said coil to circumferentially surround said coil and form an intermediate space therewith for receiving a coolant, and



means for supplying coolant to and removing coolant from said space.

4,005,303

EDM PARAMETER CONTROL SYSTEM

Kiyoshi Inoue, Tokyo, Japan, assignor to Inoue-Japan Research Inc., Yokohama, Japan

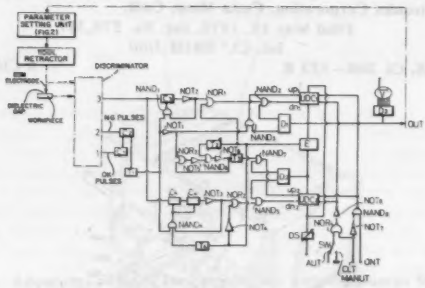
Division of Ser. No. 338,849, March 7, 1973, Pat. No. 3,875,374. This application Jan. 14, 1975, Ser. No. 540,970

Claims priority, application Japan, Mar. 7, 1972, 47-23334

The portion of the term of this patent subsequent to Apr. 1, 1992, has been disclaimed.

Int. Cl.² B23P 1/08

U.S. Cl. 219—69 C **20 Claims**



1. A system for controlling an EDM parameter in the operation of an EDM apparatus, comprising:

input circuit means having an input terminal connected in circuit with an electrical discharge machining gap formed between a tool electrode and a workpiece and adapted to respond to the state of electrical discharge machining performance in the gap for providing a first signal upon detection of the occurrence of a predetermined condition in the gap within a first time period and providing a second signal upon non-detection of such a condition in the gap throughout a second time period, and timing means for establishing said second period with a duration greater than that of said first period;

memory means connected to said input circuit means and adapted to receive said first and second signals and having a memory level arranged to be changed in accordance with the latest-received of these signals; and

setting means with an ordered set of positions arranged to establish respective values of said parameter corresponding to memory levels in said memory means and to be altered in respective directions in the ordered set in accordance with change in corresponding directions of the memory levels of said memory means; said circuit means including:

a first preset counter means with a input terminal connected

in circuit with said machining gap adapted to count electric pulses effected therethrough with an unsatisfactory machining result selectively for issuing said first signal upon counting up a preset number of such pulses within said first period, the first counter means being arranged for resetting upon termination of said first period;

a second preset counter means with an input terminal connected in circuit with said machining gap and coupled to said first counter means and adapted to count electric pulses effected through the gap of a satisfactory machining result selectively and arranged for resetting upon counting up a preset number of such pulses to define said first period; and

a third preset counter means connected with a pulse source and arranged for resetting upon counting up a preset number of pulses to define said second period.

4,005,304

ELECTRICAL DISCHARGE MACHINING PROCESS WITH FLUID CONTAINING A CATIONIC ORGANIC SURFACTANT

Robert A. Stayner, Lafayette, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed June 30, 1975, Ser. No. 591,345

Int. Cl.² B23P *1/08*

U.S. Cl. 219—69 D **10 Claims**

1. In a process for electrical discharge machining which comprises passing a spark generated by pulsed application of an electrode at a relatively high voltage to a work piece through a spark gap flooded by a dielectric fluid wherein the process generates in said fluid a dispersion of negatively charged particles from metal droplets melted off the work piece and/or electrode wear fragments, the improvement which comprises at least partially coagulating said dispersed particles with an oil-soluble cationic organic surfactant addition to a dielectric fluid composition consisting essentially of a predominant portion of an inert base fluid selected from the group consisting of hydrocarbon, oxygenated hydrocarbon, silicone oils and mixtures thereof.

4,005,305

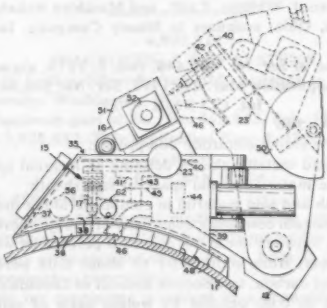
SHIELDING APPARATUS

Jerome W. Nelson; Ford S. Miller, and James B. Randolph, all of Houston, Tex., assignors to CRC-Crose International, Inc., Houston, Tex.

Filed June 11, 1974, Ser. No. 478,288

Int. Cl.² B23K *9/16*

U.S. Cl. 219—72 **5 Claims**



1. In apparatus for arc welding around a curved surface, such as the surface of a pipeline, which is subjected to external air currents that tend to interfere with the welding, and in which an arc-producing torch means is supported on a traveling carriage guided over said curved surface, and wherein the torch means is arranged to be moved selectively on the carriage from a working position adjacent the surface to a non-working position remote from said surface, the improvement which comprises a housing structure supported on said carriage separately from said torch means but normally surrounding the torch means in its working position and arranged to protect said torch means in said working position and during carriage travel from said air currents by maintaining substantially air current-exclusing contact with said surface regardless of the position of the torch means in either working or non-working positions, said housing having an access opening on its side remote from the said surface, and a closure plate for said opening associated with the welding torch means and arranged to close the access opening when the torch means is in working position and to open said access opening when the torch means is in non-working position.

4,005,306

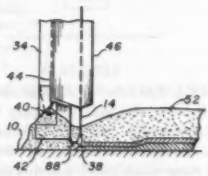
FLUX BREAKER FOR SUBMERGED ARC STRIP CLADDING OF METALLIC WORK PIECES

Clarence Winfred Overby, Rossville, Ga., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed July 17, 1975, Ser. No. 596,876

Int. Cl.² B23K *9/04*

U.S. Cl. 219—76 **3 Claims**



1. In combination with weld cladding apparatus for cladding a workpiece to be plated, a plating material strip mounted above said workpiece, and means for creating an electric arc between said workpiece and said strip to melt said strip and to deposit a plating layer on said workpiece to one side of said strip in a generally linear plating zone and wherein means are provided for submerging said arc welding zone in a layer of welding flux material, the improvement which comprises means disposed adjacent said electric arc on the other side of said plating strip for breaking up an accumulation of slag material which forms with continued use on said other side of said plating strip, said slag accumulation, if permitted to form, being capable of blocking the flux feed into the welding arc on said other side of said electrode strip.

4,005,307

METHOD AND APPARATUS FOR JUDGING QUALITY OF SPOT WELD

Yukio Tamura; Yoshikazu Tanaka; Satoshi Kuroiwa, and Mikiji Suzuki, all of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed June 3, 1975, Ser. No. 583,252

Claims priority, application Japan, Sept. 17, 1974, 49-106895

Int. Cl.² B23K *11/24*

U.S. Cl. 219—109 **5 Claims**

1. In a method of resistance spot welding by passing current between two confronting electrodes, one movable and one fixed, which squeeze therebetween workpieces to be welded to a product, the improvement wherein said method further comprises the steps of:

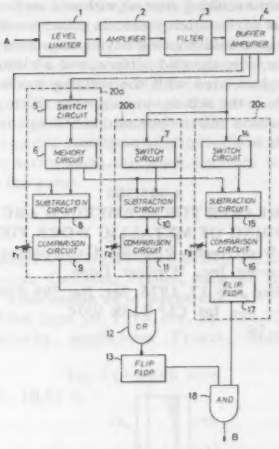
sensing the maximum displacement (M) between the two electrodes during flow of the current;

sensing the rate of displacement with time (R) in an initial stage of flow of the current during welding; and

rejecting the weld only if both of the following conditions occur -

i. the maximum displacement (M) is less than a reference value for maximum displacement (M_L) pre-established for the product as being the minimum displacement necessary to achieve a lower limit (S_L) of strength required, and

ii. the sensed rate of displacement (R) is less than a reference value for rate of displacement (R_L) pre-established for the product as being between a first rate value (R_L) which is the minimum rate necessary to achieve the lower limit (S_L) of strength required and a second rate value (R_E) which corresponds to a maximum weld strength (S_E) to obtain which some splash will necessarily occur.

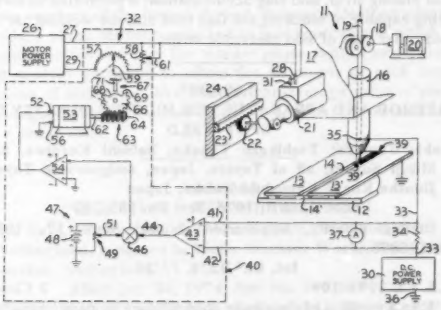


4,005,308

WELD FILL HEIGHT REGULATING SYSTEM FOR ARC WELDING APPARATUS

Elwood Chaney, Peoria, and John W. Crayton, Washington, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 23, 1974, Ser. No. 536,049
Int. Cl.² B23K 9/12
U.S. Cl. 219—125 R **4 Claims**



1. In an electrical arc welding apparatus, the combination comprising:

a welding head having means for supporting consumable welding material in spaced apart relationship to a juncture between workpieces which are to be joined,

an electrical travel motor coupled to said welding head for producing relative motion between said welding head and said workpieces in a direction parallel to said juncture,

a travel motor power supply,

a travel rate control means for said travel motor including a variable resistance having a first resistive element connected between said travel motor and said travel motor power supply and having a first movable contact which may be adjusted to vary the voltage applied to said travel motor from said travel motor power supply to vary the speed of said relative movement,

a welding current power supply for creating an electrical arc between said welding material and said workpieces to cause welding material to be melted and deposited along said juncture,

a first signal source coupled to the current path between said welding current power supply and said welding material and said workpieces and having means for producing a first signal which has a magnitude varying in accordance with variations of current flow in said path,

a reference signal source having means for producing a reference signal of predetermined selectable magnitude and of opposite polarity from said first signal,

a summing junction coupled to said first signal source and to said reference signal source for producing a summation signal having a magnitude and polarity equal to the algebraic sum of said first signal and said reference signal,

servomeans coupled between said summing junction and said travel rate control element for increasing the speed of said travel motor in response to summation signals of a first polarity and for decreasing the speed of said travel motor in response to summation signals of opposite polarity, said servomeans including a servomotor coupled to said first movable contact of said variable resistance and responsive to said summation signals from said summing junction to increase the voltage applied to said travel motor in response to summation signals of a first polarity and to decrease the voltage applied to said travel motor in response to summation signals of opposite polarity, and

minimum travel rate establishing means coupled to said travel rate control for maintaining said speed of said travel motor at least equal to a predetermined minimum value irrespective of the action of said servomeans.

4,005,309

FABRICATED WELDING WIRE FOR CORROSIVE-RESISTANT STAINLESS

Albert J. Zvanut, Whittier, Calif., and Masahiro Nakabayashi, Ashtabula, Ohio, assignors to Stoody Company, Industry, Calif.

Continuation of Ser. No. 402,440, Oct. 1, 1973, abandoned. This application Mar. 21, 1975, Ser. No. 560,849
Int. Cl.² B23K 35/22
U.S. Cl. 219—146 **7 Claims**

1. An arc-welding electrode comprising:

an elongated metallic sheath defining an internal space;

particulate material in said space of said sheath;

said sheath and said material in composite along the length of said sheath consisting essentially of a major percentage of iron, between about 9.0 and 14.0 percent by weight of chromium, from about 0.01 to about 0.08 percent by weight of carbon, an effective amount of deoxidizer material, up to 0.03 percent by weight each of sulfur and phosphorous, and further including titanium in the form of ferrotitanium having less than 80 percent by weight of titanium but an amount at least six times the percentage by weight of said carbon in said composite and not in excess of 3% by weight of said electrode, a major portion of said ferrotitanium being reduced to a size not larger than 40 mesh.

4,005,310

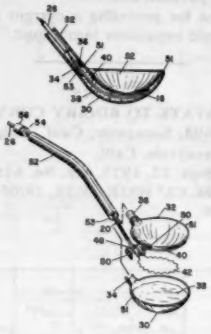
ELECTRICALLY HEATED GRAVY WARMING LADLE

Thelma E. Baisch, P.O. Box 615, Whittier, Calif. 90608

Division of Ser. No. 426,820, Dec. 20, 1973, Pat. No. 3,886,345. This application Mar. 7, 1975, Ser. No. 556,563

Int. Cl.² H05B *1/00;* **A47J** *43/28;* **H05B** *3/80*

U.S. Cl. 219—227 **3 Claims**



1. A ladle, comprising:

a bowl formed by

a pair of concavo-convex shell-like upper and lower parts, with the upper part received within the lower part, the bottoms of said parts being spaced from each other and shaped to form a hollow cavity therebetween that tapers from a maximum size at the center to a minimum size at the edges, said edges being united in a relatively thin free edge;

a handle secured to said bowl for manipulation thereof, said handle being inclined upwardly from said bowl;

an electric heating element in the space between said upper and lower shell-like parts of the bowl;

heat storing insulation for the heating element between said upper and lower shell-like parts and filling the space between said parts;

means for connecting the electric heating element to a source of electricity;

the heat storing insulation comprising electrical insulating material;

said electrical insulating material being asbestos;

each of the parts of the bowl having a projection semi-cylindrical in cross section, said projections fitting together to form a neck extending from the bowl and wherein the handle is tubular with the end adjacent the bowl receiving said neck and being secured thereto.

4,005,311

DIAGNOSTIC X-RAY SYSTEMS

Robert S. Ledley, Silver Spring, Md., assignor to Georgetown University, Washington, D.C.

Continuation-in-part of Ser. No. 443,042, Feb. 15, 1974, Pat. No. 3,922,552. This application Nov. 4, 1975, Ser. No. 628,708

Int. Cl.² G01N *21/34*

U.S. Cl. 250—445 T **18 Claims**

1. An improved diagnostic medical machine utilizing beams of radiation of small cross-sectional diameter for the purpose of mapping cross-sections of a patient's body in combination with a computer, comprising,

a table for supporting a patient in a generally horizontal position,

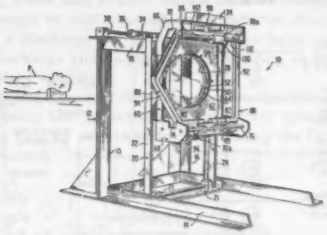
a generally vertical first frame having an opening therethrough of a size sufficiently large to permit the patient and said table to move therethrough,

a carrier frame rotatably mounted on said first frame and having a second opening generally coextensive with said first opening,

a narrow beam from a radiation source,

a collector to receive said beam of radiation,

first means mounting said source and collector to said carrier frame for translational movement with respect to said carrier and to carry said beam of radiation across said patient's body,



second means for rotating said carrier about said patient's body,

a shutter means disposed between said source and the patient's body and interrupting said beam, and

means to move said shutter from the path of said beam just prior to its approach to said patient's body as it is carried by said first means.

4,005,312

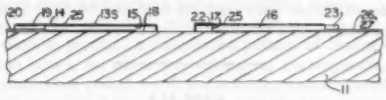
ELECTRO-OPTICAL CIRCUITS AND MANUFACTURING TECHNIQUES

Jerome H. Lemelson, 85 Rector St., Metuchen, N.J. 08840

Continuation-in-part of Ser. No. 413,983, Nov. 8, 1973, abandoned, which is a continuation-in-part of Ser. No. 849,115, Aug. 11, 1969, abandoned, and a continuation-in-part of Ser. No. 422,875, Nov. 25, 1964, Pat. No. 3,461,347, which is a continuation-in-part of Ser. No. 425,618, Dec. 17, 1973, abandoned, and a continuation-in-part of Ser. No. 115,208, Feb. 16, 1971, Pat. No. 3,801,366. This application Mar. 6, 1975, Ser. No. 555,794

Int. Cl.² G02B *27/00*

U.S. Cl. 250—551 **10 Claims**



1. A method of producing an electro-optical circuit comprising:

fabricating a composite article of a laminate of a substrate and a layer of light transmitting material by bonding said layer of light transmitting material to a selected portion of the surface of said substrate wherein said light transmitting material defines a flat strip-like light pipe capable of conducting light along its length,

securing an electrically activated light emitting means to said composite article in optical coupling relationship with an end of said flat strip-like light pipe of light transmitting material,

connecting said light emitting means to a source electrical signals defining information being processed,

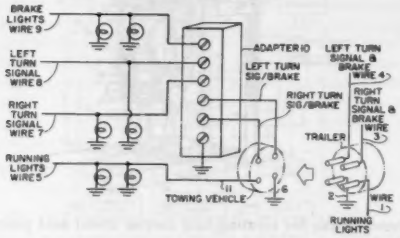
providing a photosensitive electro-optical transducing means in optical coupling relationship with said light pipe and securing said photosensitive transducing means to said composite article, and

securing electrical interconnecting means between said photosensitive means and an output circuit for utilizing and processing the signals generated by said photosensitive transducing means.

4,005,313
AUTOMOTIVE TRAILER LIGHT ADAPTER

Richard Paul Tibbits, Rochester, N.Y., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed May 14, 1975, Ser. No. 577,431
Int. Cl.² B60D *1/08*
U.S. Cl. 307—10 R **4 Claims**



1. An automotive trailer light adapter for adapting an automotive trailer having a four wire tail light configuration having a running lights wire, a trailer ground wire, a combination right turn signal and brake wire and a combination left turn signal and brake wire to a towing vehicle having a five wire tail light configuration having a running lights wire, a chassis ground wire, a right turn signal wire, a left turn signal wire and a brake lights wire, said adapter comprising

a lead for connecting a running lights wire of a towing vehicle to a running lights wire of a trailer;

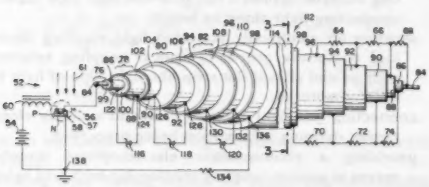
a ground lead for connecting a chassis ground wire of the vehicle to a trailer ground wire of the trailer; and

relay means connecting a right turn signal wire of the vehicle, a left turn signal wire of the vehicle and a brake lights wire of the vehicle to a combination right turn signal and brake wire of the trailer and a combination left turn signal and brake wire of the trailer, said relay means comprising four relay energizing windings each having one end connected to the ground lead, the other end of one of the windings being connected to the right turn signal wire, the other end of another of the windings being connected to the left turn signal wire, and four pairs of double pole double throw relay contacts each pair being controlled in operation by a corresponding one of the windings.

4,005,314
SHORT PULSE GENERATOR

Mortimer H. Zinn, Elberon, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed July 11, 1975, Ser. No. 595,255
Int. Cl.² H02M *3/18*
U.S. Cl. 307—110 **14 Claims**



1. A device for obtaining a relatively high voltage output pulse adapted to be coupled to an electrical switching means and a source of charging voltage, said device comprising:

a. a plurality of co-axially disposed electrically conductive tubular elements, a plurality of separate co-axially disposed insulating layers radially spacing and insulating said conductive elements, adjacent pairs of said conductive elements having respective said insulating layers disposed therebetween extending axially and forming a plurality of capacitors;

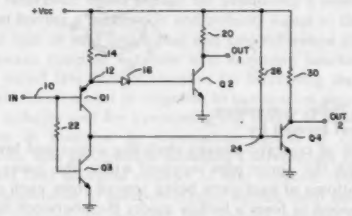
b. first means for providing a current path for charging said capacitors in parallel; and

c. second means for providing a current path for serially discharging said capacitors into a load.

4,005,315
TRIPLE STATE TO BINARY CONVERTER

Robert A. Blauschild, Sunnyvale, Calif., assignor to Signetics Corporation, Sunnyvale, Calif.

Filed Sept. 22, 1975, Ser. No. 615,476
Int. Cl.² H03K *19/28, 19/08*
U.S. Cl. 307—209 **8 Claims**



1. A triple state to binary converter having a one line ternary input and providing a two line binary output from a single polarity voltage supply, said output having four possible binary states and providing two of such states in response to a low or high input and a third of such states in response to an open or floating condition of said input, said converter comprising: a pair of output transistors connected to operate exclusively from a single fixed polarity voltage supply for providing said two line binary output; and logic level means connected to said supply for sensing said low, high and floating input conditions, and distinguishing between such conditions to drive said transistor pair to provide a unique one of said three states for each of said input conditions.

4,005,316
SWITCHING TRANSIENT SUPPRESSION CIRCUIT

John H. Tomlinson, Bridgeport, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 18, 1975, Ser. No. 641,974
Int. Cl.² H03K *5/01;* **H01H** *33/58, 7/00*
U.S. Cl. 307—247 A **9 Claims**

1. A circuit responsive to the change in state of a switch for suppressing spurious electrical pulses associated with switch contact opening and closing comprising:

trigger circuit means, said trigger circuit means including a pair of series connected Schmitt trigger circuits, said trigger circuits each having an input terminal and a pair of output terminals, a first output of each of said trigger circuits having the capability of assuming either of two logic states or a high resistance state, said trigger circuit means having an output disable input which may be employed to cause the first outputs of the trigger circuits to assume the high resistance state;

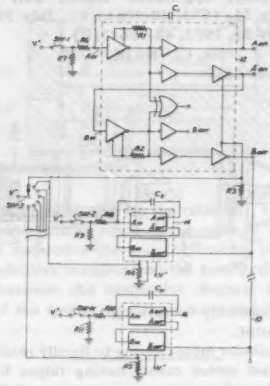
means for delivering a signal commensurate with the state of a switch to the input terminal of the first of said series connected trigger circuits of said trigger circuit means;

means for connecting the first output terminal of the second of said series connected trigger circuits of said trigger circuit means to a logic output bus;

means for clamping the second output terminal of the first

of said trigger circuits of said trigger circuit means to said input terminal of said first of said trigger circuits; and

means for generating and selectively applying a signal to said trigger circuit means output disable input whereby



said trigger circuit means will apply to the logic output bus either a logic signal commensurate with the signal delivered to the input terminal of the first of said series connected trigger circuits or will present a high resistance to the logic output bus.

4,005,317

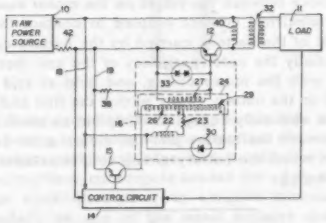
SWITCHING CIRCUITRY

Karl Hinrichs, Downey, Calif., assignor to Dressen-Barnes Electronics Corporation, Pasadena, Calif.

Filed May 27, 1975, Ser. No. 580,587

Int. Cl.² H03K *17/60, 17/04*

U.S. Cl. 307—253 **7 Claims**



1. Switching circuitry comprising:

a control switch;

a drive circuit comprising a charge circuit and a discharge circuit;

a drive inductor;

a drive transformer;

said drive transformer having a charge primary winding, a discharge primary winding, and a secondary winding;

said charge circuit comprising said secondary winding and a series circuit of said drive inductor, said control switch, and said charge primary winding;

whereby when said control switch assumes its ON state, a charge current in said charge circuit charges said drive inductor, and produces an enabling signal in said secondary winding;

a power switch adapted to permit the flow of an electric current therethrough;

means for applying said enabling signal to said power switch, for causing said power switch to quickly and positively assume its ON state and for permitting the flow of a load current;

said discharge circuit comprising said secondary winding and a series circuit of said drive inductor and said discharge primary winding;

whereby, when said control switch assumes its OFF state, the energy of said charged drive inductor directly produces a discharge current, and said discharge current in said discharge circuit produces a disabling signal in said secondary winding;

means for applying said disabling signal to said power switch for causing said power switch to quickly and positively assume its OFF state, and for terminating the flow of the load current.

4,005,318

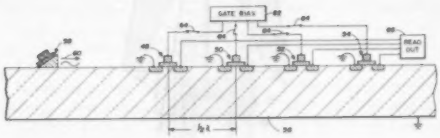
ELASTIC WAVE DETECTOR

Lewis T. Claiborne, Jr., Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 856,953, Sept. 11, 1969, abandoned. This application Nov. 4, 1971, Ser. No. 195,726

Int. Cl.² H01L *27/20, 29/78*

U.S. Cl. 307—304 **3 Claims**



1. A multicode correlator comprising:

a. a piezoresistive semiconductor substrate;

b. means on the surface of said substrate for generating an acoustic surface wave defining a plurality of sequential components respectively corresponding to portions of a preselected coded input signal;

c. a plurality of arrays of spaced-apart field-effect transistors defined in the surface of said substrate, each array extending radially along the surface of said substrate away from said surface wave generating means;

d. means for selectively biasing transitors in each of said arrays to produce a preselected pattern of charge inversion layers, the pattern in each array corresponding to a preselected coded word, the minority carrier mobility in said inverted layers detectably variable responsive to an acoustic surface wave; and

e. output means connected to each of said arrays and operably responsive to variations in minority carrier mobility, such that responsive to a coded input signal corresponding to the pattern defined by selectively biasing transistors in one of said arrays, an output signal is generated by that array when said coded surface wave propagates to a position where each of said plurality of components corresponds to a change inversion layer in said pattern.

4,005,319

PIEZOELECTRIC GENERATOR OPERATED BY FLUID FLOW

Jan Nilsson, Ronninge, and Rune Swänson, Ljungsbro, both of Sweden, assignors to Saab-Scania Aktiebolag, Linkoping, Sweden

Continuation-in-part of Ser. No. 353,323, April 23, 1973, abandoned. This application Oct. 1, 1975, Ser. No. 618,422

Int. Cl.² H01L *41/04*

U.S. Cl. 310—8.3 **5 Claims**

5. An electrical generator that can serve as a power source for electrical apparatus and which is of the type comprising a

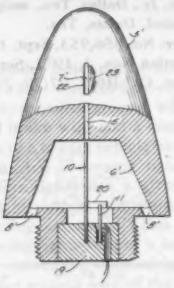
piezoelectric element and excitation means for imposing oscillatory mechanical stresses upon the piezoelectric element to transfer energy to it from fluid under pressure at a source thereof such as an inlet for ambient fluid in a moving body that carries said element, said excitation means comprising:

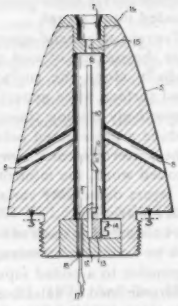
A. an elongated, resiliently flexible tongue that has one end which is substantially fixed and has its other end free, said tongue

1. having a major width dimension and a smaller minor width dimension extending in directions transverse to its width dimension so that its free end is capable of flexing oscillation in said directions, and

2. when relaxed, being straight along a substantial portion of its length from its free end;

B. nozzle means communicating with said source of fluid under pressure and having an outlet from which fluid from said source can flow in a stream, said nozzle means





1. having its outlet near the free end of said tongue and its inlet remote from the tongue,

2. having its outlet end portion straight and smooth so that the stream of fluid issuing therefrom towards the free end of the tongue tends to be steady, and

3. having its outlet axis lengthwise aligned with the central plane of said minor width of the tongue when the tongue is relaxed so that such stream, in flowing along the tongue, imparts vigorous oscillation to the tongue in said directions; and

C. means providing a force transmitting connection between said peizoelectric element and said tongue, near said one end of the tongue, by which oscillatory flexing of the tongue in said directions imposes oscillatory mechanical stresses upon the piezoelectric element.

4,005,320

BATTERY-POWERED ELECTRIC MOTOR ASSEMBLY

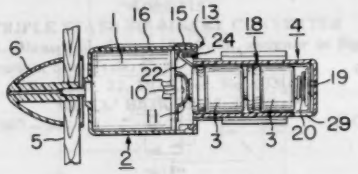
Kenichi Mabuchi, Tokyo, and Yoshihisa Tsuchimochi, Ichikawa, both of Japan, assignors to Mabuchi Motor Co. Ltd., Tokyo, Japan

Filed July 26, 1974, Ser. No. 492,027

Claims priority, application Japan, July 31, 1973, 48-86200; July 31, 1973, 48-90613[U]; July 31, 1973, 48-90616[U]; July 31, 1973, 48-90617[U]

Int. Cl.² H02K *11/00*

U.S. Cl. 310—40 MM **17 Claims**



1. A motor assembly comprising:

a electric motor;

a generally tubular motor casing to fixedly retain the motor therein, said motor casing having ridges formed on a surface thereof and a groove positioned between the ridges;

a generally tubular battery casing adapted to fixedly retain a battery therein, the motor and battery casing being axially aligned and rotatably connected at their ends so that an end of battery casing is slidably disposed inside an end of the motor casing, said battery casing having an enlarged diameter portion at the end thereof engaging with the motor casing and a groove formed on the surface of the enlarged diameter portion;

a battery contact connected to one terminal of the motor and adapted to contact one terminal of the battery;

a first electrical contact having a tongue portion and a U-shaped member, said first electrical contact being connected by said tongue portion to the other terminal of the motor, carried by the motor casing at substantially the inner periphery of the end thereof engaging with the battery casing, and inserted by said U-shaped member in said groove between the ridges on the motor case; and

a second electrical contact adapted to contact the other terminal of the battery, carried by the battery casing at substantially the outer periphery of the end thereof engaging with the motor casing, and held at said groove formed on the battery casing so that the first and second contacts ohmically engage to complete an electrical circuit between the battery and the motor at an expected position when the battery casing rotates relative to the motor casing.

4,005,321

QUARTZ CRYSTAL VIBRATOR MOUNTING

Shin Shibata, Suwa, and Kikuo Oguchi, Shimosuwa, both of Japan, assignors to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Filed Dec. 27, 1974, Ser. No. 537,028

Claims priority, application Japan, Dec. 27, 1973, 49-979

Int. Cl.² H01L *41/08*

U.S. Cl. 310—9.1 **12 Claims**

1. A mounting fo[r] supporting a flexural mode quartz crystal vibrator having two opposed surfaces with two electrodes disposed on at least one of the opposed surfaces comprising a non-conductive member having first and second conductive surfaces, spaced apart by an interval l_2, the non-conductive member having a lesser thermal coefficient of expansion than the quartz crystal vibrator, and a conductive plate secured to said first conductive surface of said quartz crystal vibrator for physically and electrically coupling said first electrode to said

first conductive surface, said conductive plate having a thermal coefficient of expansion less than the non-conductive member, and conductive means constructed and arranged to secure, rigidly fix and electrically couple said second spaced apart conductive surface to said second electrode, said conductive means being spaced apart from said first conductive

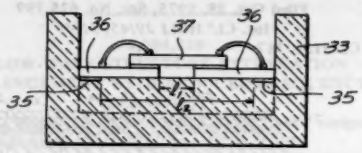


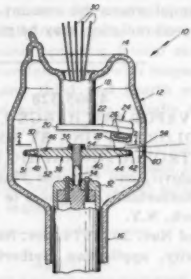
plate by an interval l_1, wherein the ratio of l_1 to l_2 is less than one and is substantially equal to the ratio of the differences between the respective thermal coefficients of expansion of the non-conductive member and the conductive plate to the difference between the respective thermal coefficients of expansion of the quartz crystal vibrator and the conductive plate.

4,005,322

ROTATING ANODE TARGET STRUCTURE

Thomas J. Koller, Huntington, Conn., assignor to The Machlett Laboratories, Incorporated, Stamford, Conn.

Filed Mar. 8, 1976, Ser. No. 664,832
Int. Cl.² H01J *35/08*
U.S. Cl. 313—60 **9 Claims**



1. An X-ray target of the rotating anode type comprising:
a disc having an annular marginal portion disposed adjacent an outer peripheral edge and provided with opposed bevel surfaces convergent toward the edge; and
a focal track layer of X-ray emissive material disposed annularly on one of the bevel surfaces and extended around the peripheral edge to terminate on the other bevel surface in a feather edge.

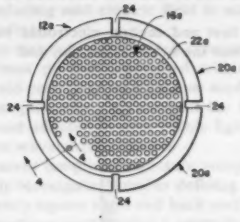
4,005,323

MICROCHANNEL PLATES IN GLASS MOUNTINGS

Colin K. Yates, and Eugene C. Jastrzebski, both of Dudley, Mass., assignors to American Optical Corporation, Southbridge, Mass.

Filed Nov. 15, 1971, Ser. No. 203,098
Int. Cl.² H01J *43/04*
U.S. Cl. 313—105 CM **5 Claims**

1. A glass microchannel plate comprising:
a multichannelled structure of electrically semi-conductive glass;
a rim of glass surrounding said multichannelled structure;
a substantial thickness of solder glass interconnecting said multichannelled structure and said rim; and



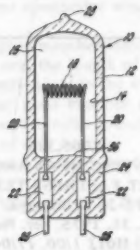
said rim having at least one slot extending completely therethrough.

4,005,324

TUNGSTEN-FLUORINE LAMP WITH NATIVE RETAINED OXYGEN THEREIN AND METHOD OF MANUFACTURE

Arthur Dolenga, Sterling Heights, and John C. Hill, Bloomfield Hills, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 17, 1976, Ser. No. 667,616
Int. Cl.² H01J *9/395*; H01K *1/50*
U.S. Cl. 313—222 **2 Claims**



1. A tungsten halogen lamp comprising a glass bulb having walls defining a sealed cavity, a tungsten filament within said bulb having spaced apart legs, a filament support means on one end of said bulb including metallic current leads and metallic foil means for connecting said metallic current leads to the legs of said tungsten filament, a fill gas mixture in said cavity including an inert gas and a gaseous fluorinated hydrocarbon consisting only of carbon, fluorine and bromine and having a composition of 3.2×10^{-7} to 8×10^{-7} gram atoms of carbon, 2.1×10^{-6} to 5.2×10^{-6} gram atoms of bromine and 1.5×10^{-6} to 3.8×10^{-6} gram atoms of fluorine per cc of cavity volume, said bulb walls, tungsten filament and filament support means having native retained oxygen thereon releasable upon bulb operation to add a further fill gas constituent of free oxygen in the range of 1.3×10^{-6} to 3.3×10^{-6} gram atoms per cubic centimeter of cavity volume to balance the gram atom constituent of the fill gas in the form of free fluorine released during bulb operation.

4,005,325

CARBON ELECTRODE FOR EMITTING LIGHT SIMILAR TO SUNSHINE FOR LIGHT-FASTNESS TESTING

Shigeru Suga, Yoyogi 5-20:2, Shibuya, Tokyo, Japan

Filed July 22, 1975, Ser. No. 598,076
Int. Cl.² H01J *1/02, 1/14, 1/38, 1/48*
U.S. Cl. 313—352 **3 Claims**

1. A carbon electrode assembly for a carbon arc lamp used for simulating sunlight in light-fastness and weathering testors, said assembly comprising:
a first elongated upper electrode element fitted at one end into said arc lamp;

an elongated second lower electrode element fitted at one end into said arc lamp, the free end thereof being opposite the free end of said first electrode and spaced therefrom;

one of said first and second electrodes being smaller in diameter than the other electrode; and

said upper and lower electrodes each being comprised of a homogeneous mixture of carbon and an incandescent material, said incandescent material being present in an amount from 6 to 12 percent by weight of the total weight of the carbon and incandescent material, and a copper metal coating surrounding the outside of said electrodes other than at the end thereof which is spaced from and opposite the other electrode.

4,005,326

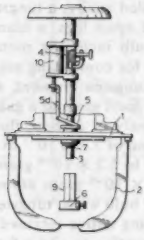
ELECTRODE MOUNTING IN AN ARC LAMP FOR USE IN LIGHT FASTNESS TESTERS

Shigeru Suga, Yoyogi 5-20-2, Shibuya, Tokyo, Japan

Filed Oct. 31, 1975, Ser. No. 627,879

Int. Cl.² H01J *1/00, 17/04, 19/00*

U.S. Cl. 313—357 **3 Claims**



1. In an arc lamp for use in light fastness testers and the like and having an upper plate and a globe detachably mounted on the lower side thereof, a lower electrode holder in said globe and depending from said plate, and an upper electrode holder above said plate having a recess for receiving the end of a cylindrical electrode therein, the improvement comprising a ring clutch between the upper electrode holder and the plate through which the upper electrode is intended to pass, a control means connected to said ring clutch for actuating said ring clutch to engage the electrode extending therethrough for moving the electrode up and down, a cylindrical metal rod having the same diameter as an electrode and extending into the recess in the upper electrode holder and extending through the ring clutch and through said upper plate into the space within said globe and opposed to said lower electrode holder, and a cylindrical carbon electrode on the lower end of said metal rod, and threaded connecting means threadedly connecting said metal rod and said electrode.

4,005,327

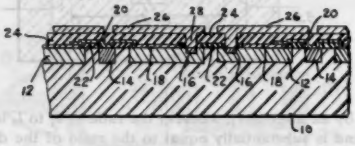
LOW BEAM VELOCITY RETINA FOR SCHOTTKY INFRARED VIDICONS

Sven A. Roosild, Framingham; Freeman D. Shepherd, Jr., Chelmsford, and Andrew C. Yang, Concord, all of Mass., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Oct. 28, 1975, Ser. No. 625,799

Int. Cl.² H01J *29/45, 31/49*

U.S. Cl. 313—367 **6 Claims**



1. A solid state retina sensing layer for infrared vidicon tubes comprising a base having one conductivity type; a plurality of cells of a second conductivity type, arranged in a two dimensional array and forming junctions with said base, a contact formed near the surface of said cell; infrared photoemitter means affixed to at least one surface of each cell; a plurality of contact means in said base located between said cells; buss means for connecting the photoemitter means with the base contact means; a dielectric coating covering the surface of the base receiving the electron beam, a metal electrode for each cell positioned on the surface of said dielectric coating and extending through the coating to the contact of said cell whereby electrons reaching the electrode will place a charge on the cell, and a resistance means connecting the base to ground potential where the amount of charge lost by the cell due to infrared radiation may be measured.

4,005,328

MERCURY VAPOR DISCHARGE LAMP FOR USE IN COLOR COPYING BY MEANS OF ELECTROPHOTOGRAPHIC PROCESSES

Dragutin Radelović, and Cornelis Machiel Verheij, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 26, 1974, Ser. No. 527,241

Claims priority, application Netherlands, Dec. 3, 1973, 7316494

Int. Cl.³ C09K *11/12, 11/16, 11/30;* **H01J** *61/44*

U.S. Cl. 313—487 **5 Claims**

1. A mercury vapor discharge lamp particularly useful for color copying by electrophotographic processes, said lamp comprising: a sealed radiation-transmitting envelope having discharge electrodes disposed at approximately the ends thereof and containing a small amount of mercury and inert ionizable gas, said envelope being coated on the interior surface thereof with a luminescent layer emitting in bands in the blue, green and red regions of the spectrum, said luminescent layer consisting essentially of two phosphors, the first of said phosphors emitting in bands both in the blue and in the green regions of the spectrum, the blue band having a maximum between 410 and 470 nm and a half-value width of less than 100 nm and the green band having a maximum of between 485 and 550 nm and a half value width of less than 100 nm and being a divalent europium and divalent manganese acti-

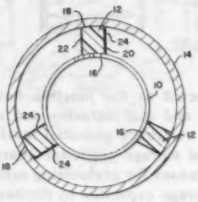
vated aluminate of barium, strontium or mixtures thereof and having a hexagonal crystal structure similar to that of the hexagonal ferrites and the second of said phosphors containing trivalent europium as an activator and emitting in a band in the red part of the spectrum, said red band having a maximum of between 600 and 650 nm and a half-value width of less than 10 nm.

4,005,329

SLOW-WAVE STRUCTURE ATTENUATION ARRANGEMENT WITH REDUCED FREQUENCY SENSITIVITY

Arthur E. Manoly, Rancho Palos Verdes, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Dec. 22, 1975, Ser. No. 643,048
Int. Cl.² H01J *25/34*
U.S. Cl. 315—3.5 **3 Claims**



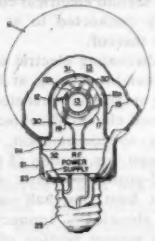
1. A slow-wave structure arrangement comprising:
a helical slow-wave structure;
a plurality of dielectric rods disposed about the peripheral surface of said slow-wave structure and extending parallel to the axis of said slow-wave structure, each of said rods having a substantially rectangular cross-section and defining first and second opposing lateral surfaces disposed substantially circumferentially with respect to said slow-wave structure and third and fourth opposing lateral surfaces disposed substantially radially with respect to said slow-wave structure; and
at least one of said rods having a coating of attenuating material disposed on a portion of said third and fourth surfaces, with said first and second surfaces being free from attenuating material.

4,005,330

ELECTRODELESS FLUORESCENT LAMP

Homer H. Glascock, Jr., and John M. Anderson, both of Scotia, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 542,375, Jan. 20, 1975, abandoned. This application Dec. 18, 1975, Ser. No. 642,056
Int. Cl.² H05B *41/24*
U.S. Cl. 315—57 **29 Claims**



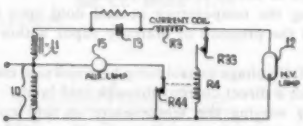
1. A fluorescent lamp structure comprising:
an evacuable, light-transmissive, substantially globular envelope having a reentrant channel therein;
a gaseous medium within said envelope adapted to sustain an electric discharge due to an electric field induced therein, said ionizable medium emitting radiation at a first wavelength when sustaining said discharge;
means for inducing said electric field in said gaseous medium including,
a closed loop magnetic core having a central opening and being at least partially contained within said channel whereby said core links said gaseous medium; and
a luminescent phosphor dispossed on the interior of said envelope and adapted to emit visible light when excited by said first wavelength radiation.
21. A fluorescent lamp base structure comprising:
a substantially rectangular member defining a cavity having approximately square front and back surfaces, said front and back surfaces each having a centrally-located perforation, the bottom surface of said cavity having a substantially rectangular perforation adapted to allow access to the interior of said cavity;
a tubular dielectric member, having sectional dimensions approximately equal to the dimensions of said perforations, extending between said front surface and said back surface and sealed thereto at the edges of said perforations; and
a closed loop magnetic core disposed on said tubular member and contained within said cavity.
27. A method of making a fluorescent lamp comprising:
preforming a glass capsule having a perforated bottom portion with a flare extending therefrom;
wrapping at least one conductive winding on a closed loop magnetic core;
inserting a tubular glass member through a central opening in said magnetic ore, the length of said tubular member being approximately equal to the width of said capsule;
aligning said tubular glass member and core within said capsule so that said tubular member is parallel to the width dimension of said capsule;
perforating said capsule at the ends of said tubular member; and
fusing the walls of said capsule to the ends of said tubular member.

4,005,331

HIGH INTENSITY DISCHARGE LAMP WITH AUXILIARY LIGHT

Victor Horowitz, Oceanside, N.Y., assignor to Current Industries, Inc., Oceanside, N.Y.

Continuation-in-part of Ser. No. 371,503, June 19, 1973, abandoned. This application Oct. 8, 1974, Ser. No. 513,064
Int. Cl.² H05B *41/46*
U.S. Cl. 315—92 **3 Claims**



1. A lighting system comprising, in combination, a high intensity discharge lamp, a first means to provide power to said high intensity discharge lamp, ballast means connected between said discharge lamp and said first power means, an auxiliary lamp, a second means to provide power to said auxiliary lamp, said second power means being electrically isolated from said first power means, and control means automatically responsive to hot and cold starting conditions for turning on said auxiliary lamp during and only during both hot and cold starts; said control means comprising first and second switching means; said first switching means comprising a first relay having a first coil and normally open pair of first contacts, said coil being connected in series with said discharge lamp and said ballast, said pair of contacts having a closed state when

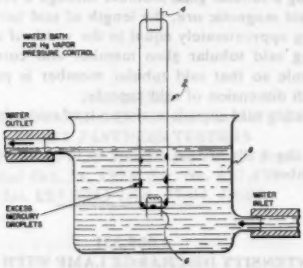
the current through said discharge lamp is greater than a first predetermined value and an open state when said current is less than said first predetermined value; said second switching means connected in series with said auxiliary lamp and said second power means; said second switching means being in a normally closed state and including additional means responsive to said first switching means to open said second switching means to place it into its open state; said auxiliary lamp being lit solely when said second switching means is in said closed state; said additional means being disabled by said open state of said relay contacts and enabled by said closed state of said relay contacts; when enabled by said relay contacts, said additional means being responsively coupled to the voltage across said high intensity discharge lamp and said second switching means having said closed state when said voltage is less than a second predetermined value and having said open state when said voltage is greater than said second predetermined value; when disabled by said relay contacts, said additional means being electrically decoupled from said high intensity discharge lamp, said second switching means being in said closed state when said additional means is so decoupled.

4,005,332

EFFICIENT DC OPERATED FLUORESCENT LAMPS

Charles F. Gallo, and Thomas J. Hammond, both of Penfield, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed July 14, 1975, Ser. No. 595,936
Int. Cl.² H01J *61/52, 7/24*
U.S. Cl. 315—112 **5 Claims**



1. A method of optimizing the operation of a fluorescent lamp having a pair of electrodes and containing an excess of mercury in a lamp tube at a cold spot therein, to optimize its radiant output, including the steps of:

orienting said lamp and electrodes so that said cold spot is adjacent to one of said electrodes,

controlling the temperature at said cold spot to thereby control the pressure of mercury vapor within said lamp tube,

applying DC voltage to said lamp between said electrodes to establish a direct current through said lamp,

adjustably varying the temperature at said cold spot to achieve maximum output intensity from said lamp at said current.

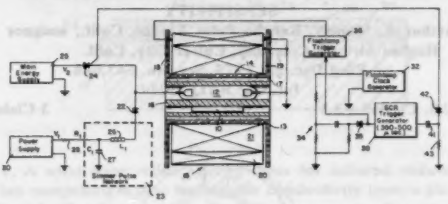
4,005,333

APPARATUS FOR INCREASING OUTPUT EFFICIENCY OF AN OPTICALLY PUMPED Nd:YAG LASER

Richard W. Nichols, Manhattan Beach, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed June 3, 1974, Ser. No. 475,685
Int. Cl.² H05B *37/00;* **H01S** *3/00*
U.S. Cl. 315—173 **3 Claims**

1. An apparatus for optically pumping a laser, said apparatus comprising a longitudinal flashlamp having first and second electrodes adapted to be mounted parallel to and coextensive with an element of laser material, said first electrode being maintained at a substantially fixed reference potential level; a main energy storage device for storing an electric charge at a first potential relative to said reference potential level; an auxiliary power supply for providing direct-current energy at a second potential level relative to said reference potential level, said second potential level being no greater than the first potential level; a current limiting resistor, and inductor and a diode serially connected in the order named from said auxiliary power supply to said second electrode of said flashlamp, said diode being poled to allow current flow towards said flashlamp; a storage capacitor having a first



electrode connected to the junction between said current limiting resistor and said inductor and a second electrode maintained at a reference potential level whereby said first electrode of said storage capacitor charges to said second potential level; means for preionizing said flashlamp thereby to allow said storage capacitor to discharge serially through said inductor and said flashlamp; and means coupled from said main energy storage device to said second electrode of said flashlamp for electronically releasing energy therefrom through said flashlamp at a predetermined interval of time subsequent to said flashlamp being pre-ionized during the discharge of said storage capacitor.

4,005,334

ELECTRIC INCANDESCENT LAMP COMBINATION FIXTURE DEVICE

Peter Andrews, 190 Gebhardt Road, Penfield, N.Y. 14526

Continuation-in-part of Ser. No. 240,605, April 3, 1972, abandoned, which is a continuation-in-part of Ser. No. 25,994, April 6, 1970, abandoned. This application Feb. 12, 1974, Ser. No. 442,082
Int. Cl.² H05B *37/00*
U.S. Cl. 315—208 **21 Claims**

1. An improved hung type of electric current incandescent lamp dimming combination fixture device, for electrical connection to a source of alternating electric current, comprising in combination:

a. an electric current incandescent lamp combination fixture having

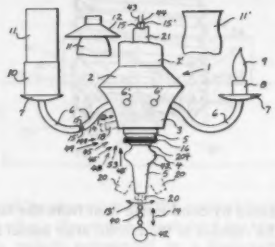
1. at least one portion of a first electrical conducting wire member and a second electrical conducting wire member electrically connected to at least one electrical circuit portion thereof;

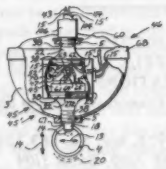
2. at least one alternating electric current incandescent lamp socket member having at least one receptacle portion having at least one first electrical contact member and a second electrical contact member therein;

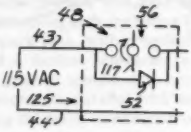
2. at least one subcombination means substantially housed in at least one portion of said fixture and consisting of a 2-position electric selectively switching means and at least one half-wave diode rectifying means being electrically connected between a first portion and a second portion of said first electrical conducting wire member which is also electrically connected substantially to said first electrical contact member;

b. said fixture having at least one portion of said first electrical conducting wire member and said second electrical conducting wire member housed in at least one portion thereof for electrical connection to said source of said

electric current and for passing at least one electrical portion of said source of said electrical current through at least one portion of said first said conducting wire member and through at least one portion of said subcombination means and through at least one said contact member of said socket member and through at least one filament member enclosed in said lamp and substantially back through said second said contact member of said socket member and through said second conducting wire member to said source of said electric current when at least one electrical base portion of said lamp is removably inserted into said receptacle portion and when said source of said current is passed substantially to said switching means;







c. said switching means having a conventional manually operative means which is alternatingly manually operable at said fixture device into a half-wave diode rectified substantially half-on "dim" electrical switching position or into an "on" electrical switching position for selectively passing a half-wave rectified and a non-rectified full-wave portion of said source of said electric current to said filament member

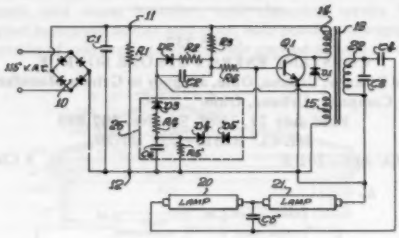
while at least an expensive 24-volt electrical relay switching means is otherwise saved when said subcombination means is electrically connected between said relay and said first said contact member of said socket member.

4,005,335

HIGH FREQUENCY POWER SOURCE FOR FLUORESCENT LAMPS AND THE LIKE

Lloyd J. Perper, Tucson, Ariz., assignor to Iota Engineering Inc., Tucson, Ariz.

Filed July 15, 1975, Ser. No. 596,069
Int. Cl.² H05B 41/29
U.S. Cl. 315—224 14 Claims



1. In a high frequency power source for a load such as gas discharge lamps, and having an inverter with oscillator circuit and transformer, said transformer having primary, secondary and feedback windings, said oscillator circuit including a transistor having emitter and collector electrodes connected in series with said primary winding across a pair of dc input terminals and having the base and one of said electrodes connected across said feedback winding, the improvement comprising:

a detector circuit connected across the transistor output developed at a winding of said transformer for developing a control signal varying as a function of said transistor output; and

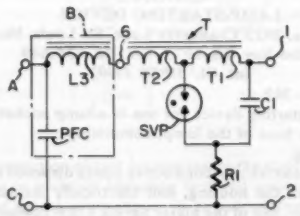
first means for connecting said control signal to the base of said transistor in parallel with the output of said feedback winding in current controlling relation when said control signal exceeds a predetermined value, said first means including a zener diode and a second diode connected in series in opposing polarity between said detector circuit and transistor base.

4,005,336

HIGH INTENSITY DISCHARGE LAMP STARTING CIRCUIT

Daniel C. Casella, South Hamilton, Mass., assignor to GTE Sylvania Incorporated, Danvers, Mass.

Filed Jan. 3, 1975, Ser. No. 538,349
Int. Cl.² H05B 41/18
U.S. Cl. 315—239 2 Claims



1. A starting circuit for a high intensity discharge lamp comprising:

alternating current line terminals,

lamp terminals having connections to the line terminals, at least one connection including an inductance,

a voltage responsive current switching surge voltage protector breakdown device connected to the inductance inter-

mediate its ends, said device having a switching time in the order of a microsecond,

a capacitor and the breakdown device connected to each other through a portion of the inductance, and

a resistance in series with the capacitor across the lamp terminals,

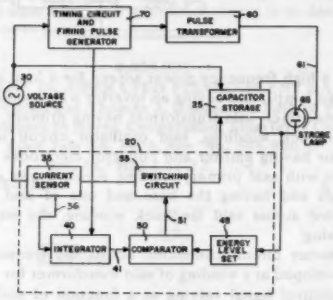
wherein the inductance includes an inductive reactor and at least one winding of a pulse transformer connected between the reactor and one lamp terminal.

4,005,337

CONSTANT ENERGY STROBE SOURCE

Blaine R. Rabe, Urbana, Ohio, assignor to Grimes Manufacturing Company, Urbana, Ohio

Filed July 21, 1975, Ser. No. 597,893
Int. Cl.² H05B *41/32, 41/29*
U.S. Cl. 315—241 S **9 Claims**



1. In a lighting system in which a capacitor means for storing energy is successively charged by a power source and then discharged through a strobe lamp,

the improvement comprising:

control means, connected between said power source and said capacitor means, for monitoring the amount of energy applied to said capacitor means for disconnecting said power source from said capacitor means when the amount of energy applied to said capacitor means equal a predetermined constant amount of energy, said control means comprising:

sensor means for sensing the current applied to said capacitor means and for supplying an output proportional thereto,

and, integrator means for integrating the output of said sensor means.

4,005,338

LAMP-STARTING DEVICE

Donald J. Rios, 3923 Cranberry Lane, St. Louis, Mo. 63121

Filed Nov. 26, 1975, Ser. No. 635,649
Int. Cl.² H05B *39/02*
U.S. Cl. 315—362 **7 Claims**

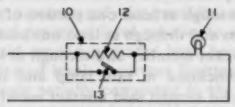
1. A lamp-starting device for use in a lamp socket adapted to receive the base of the lamp, comprising:

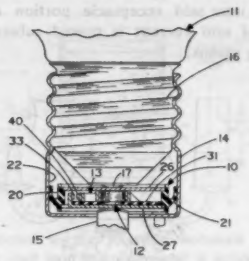
a. a housing,

b. a pair of electrically-conductive plates disposed in spaced relation in the housing, and electrically insulated from each other, one of the plates having a first contact located between the plates,

c. an electrical resistor located between, engaging and electrically connecting the plates, the resistor being in the circuit when the lamp is initially energized, and

d. a temperature-responsive bimetal strip located between the plates, the bimetal strip being electrically insulated from the said one plate, and electrically connected to and engaging the other of said plates that is adapted to engage the lamp base, the strip having a second contact movable into engagement with the first contact when the bimetal





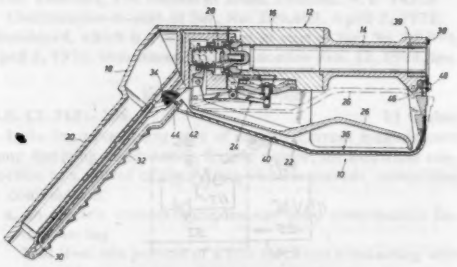
strip is heated by conductive heat from the lamp socket to by-pass the resistor in the circuit after initial energization.

4,005,339

PLASTIC FILLING NOZZLE FOR USE AT FILLING STATIONS

Maurice Plantard, Antony, France, assignor to Shell Oil Company, Houston, Tex.

Filed June 2, 1975, Ser. No. 583,124
Int. Cl.² H05F *3/00;* **B65B** *3/04*
U.S. Cl. 217—2 J **1 Claim**



1. An electrically conductive nozzle assembly for delivery of a liquid from a source to a liquid receiver having an inlet, said nozzle assembly comprising: (1) a rigid plastic nozzle including a nozzle inlet adapted for connection to a source of liquid, said source having electrical path means communicating with an electrical ground; a nozzle outlet; a nozzle housing coupling said nozzle inlet and said nozzle outlet; control means for controlling liquid flow from said nozzle inlet through said nozzle housing to said nozzle outlet; and a proper insertion safety valve for preventing discharge of liquid through said control valve unless the nozzle is properly inserted into the liquid receiving inlet; and (2) means for conducting an electrical charge comprising an annular conductor disposed on said nozzle and adapted to make electrical connection with the electrical path means of said liquid source; electrical conductive means disposed on said nozzle outlet to make contact with said liquid receiver inlet, said electrical conductive means being a lever pivoting on said nozzle and operatively connected to said safety valve for opening said safety valve when

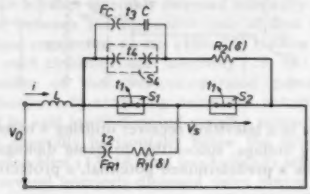
the nozzle outlet is introduced into the liquid receiver inlet; and electrical connective means for coupling said electrical conductive means with said annular conductor.

4,005,340

APPARATUS FOR THE CURRENT LIMITING INTERRUPTION OF CURRENTS AT HIGH VOLTAGES

Hagen Hürtel, Braunschweig, Germany, assignor to Dieter Kind, Braunschweig, Germany

Filed May 9, 1975, Ser. No. 576,235
Int. Cl.² H02H *7/22*
U.S. Cl. 317—11 A **3 Claims**



1. In a circuit arrangement for the current-limiting interruption of high-voltage direct and alternating currents including a commutation switch connected in a high-voltage main, a residual current switch connected to said commutating switch, and a shunt path connected in parallel with said commutation switch with said shunt path including the series connection of a spark path and a temperature dependent resistor having a strongly positive temperature coefficient, the firing voltage of said spark path being such that said spark path responds after a predetermined arc voltage has been reached at said commutation switch upon opening thereof to cause the current to commutate to said shunt path, and said temperature dependent resistor being dimensioned so that in its cold state it can fully take over the maximum current of said commutation switch at said threshold value for the series-connected spark path and is heated to such an extent that, at maximum energy absorption, it reaches its highest permissible rise in resistance without being destroyed; the improvement comprising: a further commutation switch connected in series with said first mentioned commutation switch; a further shunt path connected in parallel with the series connection of said first mentioned commutation switch and said further commutation switch, said further shunt path including the series connection of a quenching spark path, with constitutes said residual current switch, and a further temperature dependent resistor having a strongly positive temperature coefficient; an auxiliary shunt path connected in parallel with said quenching spark path and including the series connection of another spark path and a capacitor; and said quenching spark path has a firing voltage which is substantially higher than that of said first mentioned spark path and that of said another spark path.

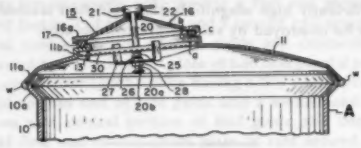
4,005,341

CASING CONSTRUCTION FOR POLE TYPE DIELECTRIC CONTAINING TRANSFORMER

Roy E. Uptegraff, Jr., Scottdale; Charles C. Dixon, Connellsville, and Ravindra N. Rahangdale, Mount Pleasant, all of Pa., assignors to R. E. Uptegraff Manufacturing Company, Scottdale, Pa.

Filed Dec. 17, 1975, Ser. No. 641,387
Int. Cl.² H01F *27/02;* **H02H** *7/04*
U.S. Cl. 317—15 **17 Claims**

1. In an improved overhead transformer enclosure construction which is adapted to carry a dielectric liquid therein, a hollow elongated casing having sealing-off side and top and bottom end walls and that generally has an outwardly convex curvature, an open hole portion through the top end wall defining a combined pressure relief and maintenance hand hole having a seating flange thereabout, and an easily removable and insertable pressure relief and hand hole cover assembly; said assembly comprising: a cover member of outwardly curved shape provided with a sealing flange thereabout, said sealing flange being adapted to cooperate with said seating flange for closing-off said open hole portion, an operating stem rotatably extending through said cover member and having an outer handle portion and an inner threaded end portion, spring and clamping means positioned on said stem beneath said cover member, said clamping means being adapted to extend across said open hole portion to engage an underside of said seating flange, a nut carried on said threaded



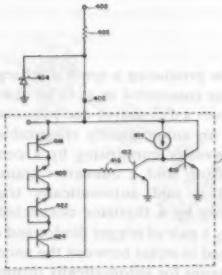
end portion and retained by said spring and clamping means in a non-rotating position with respect to and on said stem for moving said spring and clamping means inwardly and outwardly thereon and with respect to said cover member when said stem is rotated by said handle means relative thereto, said spring means being positioned between said nut and said clamping means, said stem being adapted to, in one direction of rotation, apply an increasing cover member closing force to said spring and clamping means and to, in an opposite direction of rotation, release the cover member closing force on said spring and clamping means and permit a tilting in and out insertion and removal of said cover assembly with respect to said open hole portion.

4,005,342

INTEGRATED CIRCUIT OVERVOLTAGE PROTECTION CIRCUIT

William Folsom Davis, Tempe, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Continuation of Ser. No. 332,949, Feb. 15, 1973, abandoned. This application Nov. 15, 1974, Ser. No. 524,186
Int. Cl.² H02H *3/22*
U.S. Cl. 317—16 **5 Claims**



1. A protection circuit for increasing the capability of a first transistor in a circuit including first and second terminals to withstand severe overvoltages in an automotive environment between said first and second terminals comprising:

protection circuit means connected between a base and an emitter of said first transistor and also connected to said first terminal for increasing the breakdown voltage of said first transistor from its BV_{CEO} breakdown voltage to its BV_{CES} breakdown voltage in response to an overvoltage occurring between said first and second terminals;

said protection circuit means including a second transistor

having a collector connected to a base of said first transistor and an emitter connected to said second terminal, a plurality of reverse biased diode-connected transistors connected in series with a resistor, said resistor and said reverse biased diode-connected transistors being connected between said first terminal and a base of said second transistor, said first transistor having an emitter connected to said second terminal and a collector connected to said first terminal;

wherein said first transistor is selected so that said BV_{CEO} breakdown voltage is of sufficiently low magnitude that said first transistor would ordinarily be destroyed by said severe overvoltages in the absence of said protection circuit means, and said BV_{CES} breakdown voltage is of sufficiently high magnitude that said first transistor will not be destroyed by said severe overvoltage.

4,005,343

CIRCUIT FOR PRODUCING A SPARK DISCHARGE

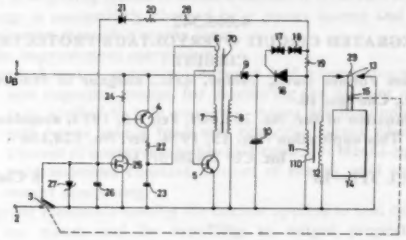
Adolf Lamprecht, Hausen, Germany, assignor to Rowenta-Werke GmbH, Offenbach (Main), Germany

Filed Apr. 18, 1975, Ser. No. 569,586

Claims priority, application Germany, Apr. 23, 1974, 2419403

Int. Cl.² F23Q *2/28, 3/01*

U.S. Cl. 317—96 **1 Claim**



1. A circuit for producing a spark discharge comprising, an ignition capacitor connected so as to be chargeable by a voltage converter from a d.c. source and connected to a discharge circuit through an automatically triggerable electric switch, said voltage converter comprising by a control transistor, a switching transistor, and a converter transformer having a feedback winding, said automatically triggerable electric switch comprising by a thyristor connected to said ignition capacitor and by a pair of trigger diodes and a current-limiting resistor connected in series between the anode and the gate of said thyristor, means for automatically turning off said voltage converter and simultaneously disconnecting said voltage converter from said d.c. source upon said electric switch being triggered, said latter means comprising a field-effect transistor having its collector and emitter connected across said d.c. source, having its collector connected to the base of said control transistor, and having its control input gate connected through a trigger path to a junction between said trigger diodes and said current-limiting resistor of said automatically triggerable electric switch, a capacitor connected to the control input gate of said field-effect transistor, and a zener diode connected in parallel with the capacitor connected to said field-effect transistor.

4,005,344

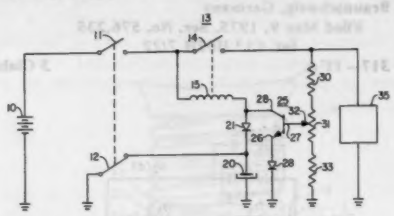
PROTECTION CIRCUIT FOR BATTERY POWERED ELECTRONIC DEVICES

Jagjit R. Gaind, Forest Park, and Philip J. Nowaczyk, Chicago, both of Ill., assignors to Zenith Radio Corporation, Chicago, Ill.

Filed June 23, 1975, Ser. No. 589,639

Int. Cl.² H02H *3/24*

U.S. Cl. 317—31 **2 Claims**



1. For use in a television receiver utilizing a battery source of operating voltage, susceptible to being damaged by discharge below a predetermined potential, a protection circuit comprising:

a viewer operable on-off switch coupled to said battery;

a relay, having a normally open switch path in series with said on-off switch on said television receiver and a control winding having first and second ends, said first end coupled to said on-off switch;

a capacitor;

a diode coupling said capacitor to said second end of said control winding, said capacitor being charged through said control winding and said diode, when said on-off switch is moved to its on position, to momentarily energize said relay; and

a transistor having a collector electrode coupled to said second end of said control winding, an emitter electrode coupled to ground, and a base electrode coupled to said television receiver, said transistor conducting to hold said relay energized if said battery potential exceeds said predetermined potential.

4,005,345

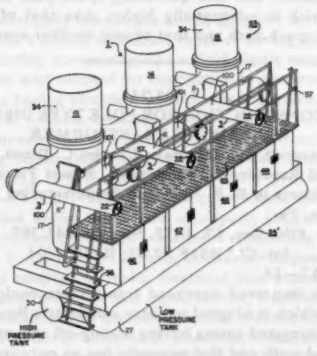
MULTI-PHASE GAS-TYPE CIRCUIT-INTERRUPTER SUBSTITUTION MODULAR CONSTRUCTION

Richard E. Kane, Monroeville, and Charles E. LeRow, Jr., Jeannette, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 27, 1974, Ser. No. 527,931

Int. Cl.² H01H *9/00, 33/54;* **H02B** *1/20*

U.S. Cl. 317—103 **6 Claims**



1. A multiphase compressed-gas circuit-breaker installation

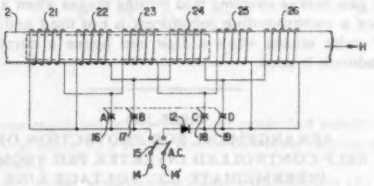
comprising, in combination, means defining a generally-rectangularly-shaped lower-disposed main metallic support frame, a plurality of laterally-spaced upstanding generally-cylindrically-shaped circuit-breaker assemblies (13, 14) extending upwardly from, and supported by said lower-disposed main metallic generally-rectangularly-shaped support frame, first line-terminal connecting means (100) for each circuit-breaker assembly (13, 14) disposed adjacent the upper end of the respective circuit-breaker assembly (13, 14), cooperable second line-terminal connecting means (101) disposed below the aforesaid first-mentioned first line-terminal connecting means (100), yet spaced upwardly from said main lower-disposed generally-rectangularly-shaped metallic support frame (25), pressure-operated separable power contact means for each circuit-breaker assembly disposed internally thereof and interposed between the respective pair of first and second line-terminal connecting means (100, 101), valve means provided for each circuit-breaker assembly (13, 14) for causing the actuation of the pressure-operated power contacts thereof, horizontally-extending valve-rod actuating linkage supported by said lower-disposed metallic support frame and extending generally horizontally below the several circuit-breaker assemblies (13, 14) and mechanically interconnected with the several interiorly-disposed valve means for the respective circuit-breaker assemblies (13, 14), said valve-rod actuating linkage (65) being disposed in the available space between the support frame and the foundation level, two horizontally-extending, generally-parallel, high and low-pressure gas-reservoir tanks (27, 30) extending longitudinally lengthwise of the circuit-breaker assembly and disposed below said generally-rectangularly-shaped lower-disposed support frame, gas-conduit means interconnecting said high pressure gas-reservoir tank (30) and each circuit-breaker assembly (13, 14), an operating-mechanism housing compartment disposed above the lower-disposed generally-rectangularly-shaped support frame and interposed between two adjacentally-disposed circuit-breaker assemblies, said mechanism compartment housing containing an operating mechanism for operating said horizontally-extending valve-rod linkage, and said low-pressure gas-reservoir tank (27) extending longitudinally lengthwise of said circuit-breaker installation and constituting the sole side support for said lower-disposed metallic generally-rectangularly-shaped support frame along one lower longitudinal side thereof.

4,005,346

DIRECT ELECTROMAGNETIC RECIPROCATING MOTOR

Tsang-Chen Hsia, 58, Lane 72, Sec. 3, Ho Pin East Rd., Taipei, China /Taiwan

Filed Oct. 29, 1975, Ser. No. 626,853
Int. Cl.² H02K *33/10*
U.S. Cl. 318—128 **10 Claims**



1. A reciprocating motor, comprising:

a hollow, tubular guide having a first coil mounted about a first end thereof, a third coil mounted about a central portion thereof, and a second coil mounted about a second end thereof;

a ferromagnetic piston mounted in sliding engagement within said hollow guide, having a length which overlaps said first and third coils when located at said first end and which overlaps said second and third coils when located at said second end;

a first ferromagnetic pole piece mounted on the central portion of said guide and spaced at said piston length from said first end thereof;

a second ferromagnetic pole piece mounted on the central portion of said guide and spaced at said piston length from said second end thereof;

a ferromagnetic pivot plate, pivotally mounted on the central portion of said guide, having a first end which contacts said first pole piece at a first pivotal position and a second end which contacts said second pole piece at a second pivotal position;

a first ferromagnetic yoke having a first end mounted on said first end of said guide and a second end spaced from said central portion of said guide and contacting said second end of said pivot plate at said first pivotal position;

a second ferromagnetic yoke having a first end mounted on said second end of said guide and a second end spaced from said central portion of said guide and contacting said first end of said pivot plate at said second pivotal position;

said plate pivoting into said first pivotal position forming a first magnetic circuit with said piston, first pole piece, and first yoke when said piston is at said first end of said guide;

said plate pivoting into said second pivotal position forming a second magnetic circuit with said piston, second pole piece, and second yoke when said piston is at said second end of said guide;

an electrical switching means mounted on said pivot plate and electrically connected to said first and second coils, for energizing said first coil when said plate is at said second pivotal position and for energizing said second coil when said plate is at said first pivotal position;

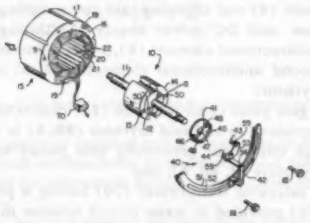
whereby said piston is forced into reciprocating motion within said guide.

4,005,347

ELECTRONICALLY COMMUTATED MOTOR AND METHOD OF MAKING SAME

David M. Erdman, Fort Wayne, Ind., assignor to General Electric Company, Fort Wayne, Ind.

Filed June 24, 1974, Ser. No. 482,409
Int. Cl.² H02K *29/00*
U.S. Cl. 318—254 **23 Claims**



1. A brushless DC motor having a stationary armature comprising an armature core and a plurality of winding turns disposed on said armature core, a permanent magnet rotor adapted to rotate about a longitudinal axis in response to magnetic fields established by said armature, means for developing position control signals indicative of the rotational position of said rotor and operative for causing commutation of each of the windings at an advancement angle before the rotor rotates to a position such that the center of a magnetic pole thereof of a first polarity is displaced 135 electrical degrees from the center of a magnetic pole of a polarity opposite to said first polarity and established by the winding being commutated.

4,005,348

CONTROL SYSTEM FOR DC MOTORS

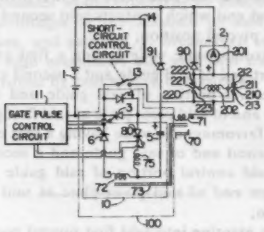
Masayoshi Nilmi, Toyota, and Kinya Ishida, Kariya, both of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed May 16, 1975, Ser. No. 578,337

Claims priority, application Japan, May 21, 1974, 49-57535; Apr. 2, 1975, 50-45291[U]

Int. Cl.² H02P 5/16

U.S. Cl. 318—373 7 Claims



1. A DC motor control system used for controlling a DC motor (2), comprising:

a. a main circuit including a DC power source (1), a main thyristor (3) and a DC motor (2) which are connected in series with one another, said main circuit controlling power supplied to said DC motor (2) from said DC power source (1) in accordance with on and off operations of said main thyristor (3);

b. a diode (4) connected in reverse parallel relation with said main thyristor (3);

c. a commutation circuit having a reversing circuit including a commutating capacitor (5), a commutating reactor (75) and a first unidirectional element (80, 80*a*), said reversing circuit reversing a charge stored on said commutating capacitor (5) by a resonance circuit composed of said commutating capacitor (5) and said commutating reactor (75) through said first unidirectional element (80, 80*a*), and a reverse biasing charging circuit including a second unidirectional element (6) connected across the terminals of said main thyristor (3) through said commutating capacitor (5), said reverse biasing charging circuit reverse biasing said main thyristor (3) by causing a reversed charge on said commutating capacitor (5) to flow through said second unidirectional element (6) and said diode (4) and charging said commutating capacitor (5) from said DC power source (1) through said second unidirectional element (6), at least one of said first and second unidirectional elements (80, 6) consisting of a thyristor;

d. a gate pulse control circuit (11) connected to said main thyristor (3) and said thyristor (80, 6) in said commutation circuit for generating gate pulses to turn on said thyristors (3, 80, 6); and

e. a saturable transformer (70) having a primary winding (71) provided in series circuit relation in said main circuit, a secondary winding (72) provided in series circuit relation in said reverse biasing charging circuit and a core (73) having said primary winding (71) and said secondary winding (72) wound thereon whereby current flows in each of said windings (71, 72) in such a manner that a magnetic flux produced by the current flowing in one of said windings (71, 72) cancels a magnetic flux produced by the current flowing in the other of said windings (71, 72) and said core (73) is saturated by a magnetic flux produced by the current flowing in said primary winding (71), said saturable transformer (70) returning the current flowing in said main circuit to said reverse biasing charging circuit for improving the commutation efficiency of said reverse biasing charging circuit.

4,005,349

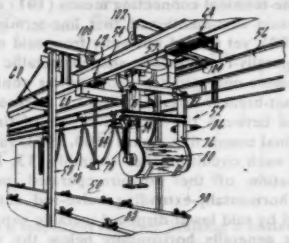
CONTROL SYSTEM FOR CONVEYING APPARATUS

Michael A. Brian, St. Clair Shores, Mich., assignor to Oxy Metal Industries Corporation, Warren, Mich.

Division of Ser. No. 122,820, March 10, 1971, Pat. No. 3,764,990. This application May 25, 1973, Ser. No. 363,788

Int. Cl.² G05B 19/18

U.S. Cl. 318—569 10 Claims



1. In a control system for an electrochemical workpiece processing apparatus and including programming means, having a tape reader, wherein the workpiece is sequenced between or among a plurality of work stations in response to commands generated by the programming means with each of the work stations having a preselected address and with at least one of the work stations having a plurality of positions and with that one of the work stations having a preselected main address, with each of the plurality of positions having a separate subaddress, said system comprising: binary coded decimal address storage means for storing the main address and having a predetermined plurality of possible subaddresses sequentially derived from the main address, storage circuit means for storing information as to which of said predetermined subaddresses are used, and which subaddresses are not used and being selectively settable as to which are to be used or not, and means connected to said storage means for incrementing said storage means in response to an indication of whether a subaddress has been selectively set to be used or not used, including a binary coded decimal-to-decimal converter circuit having a digital output circuit for at least some digits between 0 and N, N being an integer, with each said subaddress having a corresponding digit in said digital output circuit, output gate means having an input circuit adapted to be connected to each said digital output circuit, and circuit means interconnecting said digital output circuit to said input circuit of said output gate means in response to said indication of whether a digit, and hence a corresponding subaddress, was selectively set to be used or not used, and pulse circuit means for providing incrementing pulses to said storage means sequentially through each of said predetermined subaddresses, said gate means enabling said pulsing means when a digit and hence a corresponding subaddress is not used and disabling said pulse means when a digit and hence a corresponding subaddress is used.

4,005,350

ARRANGEMENT FOR PROTECTION OF SELF-CONTROLLED INVERTER FED FROM AN INTERMEDIATE D.C. VOLTAGE LINK

Jörg Brenneisen, Mannheim, Germany, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Sept. 23, 1974, Ser. No. 508,675

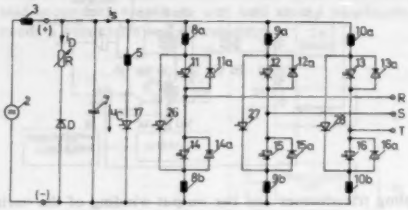
Claims priority, application Germany, Sept. 29, 1973, 2349161

Int. Cl.² H02M 1/18

U.S. Cl. 321—11 2 Claims

1. Arrangement for protection of a self-controlled polyphase bridge type inverter utilizing controllable valves of the semi-conductor type such as thyristors with anti-parallel con-

nected diodes and series connected inductances in each of the bridge branches and which is fed from the output of a rectifier by way of an intermediate d.c. voltage link circuit and wherein said link circuit includes at least one series connected smoothing inductance preceding the inverter and at least one parallel connected smoothing condenser the improvement where in the event of a throughgoing ignition fault in the valves of aay one of the bridge branches which would short-circuit said d.c. voltage link circuit all controllable valves of the inverter are activated simultaneously by an ignition pulse, said smoothing



condenser together with the sum of all inductances included in the converter form an oscillating circuit while all of the valves are simultaneously ignited, and wherein a diode in series with an adjustable resistor is connected electrically in parallel with said smoothing condenser, said diode being connected in the blocking direction relative to the normal polarity of the d.c. voltage link circuit and providing an electrically conducting connection between the poles of said smoothing condenser only in the event of any fault after the change in polarity of the smoothing condenser caused by the oscillation beginning with the second half-cycle of the oscillation voltage.

4,005,351

VOLTAGE-REGULATED AND OVERCURRENT-PROTECTED POWER SUPPLY

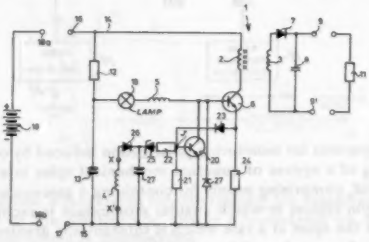
Rudolf Blum, Wendlingen, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Oct. 9, 1975, Ser. No. 621,001

Claims priority, application Germany, Dec. 6, 1974, 2457664

Int. Cl.² H02M 3/335

U.S. Cl. 321—14 **6 Claims**



1. Voltage-regulated and overcurrent-protected power supply for energization by a power source of widely varying voltage comprising

a blocking oscillator circuit including a transformer (1) and a switching transistor (6), the primary (2) of the transformer being connected into the output circuit of the switching transistor (6);

an output circuit including a first secondary winding (3, 34) of the transformer, a rectifier (7) connected in series with one terminal of the first secondary winding a main capacitor (8) connected across the other terminal of the first secondary winding (3) and the free terminal of the rectifier (7) and output terminals (9, 9') connected across the main capacitor (8);

a single control transistor (20) having its output circuit connected to the blocking oscillator to control the conduction state of the switching transistor (6);

and two control branch circuits (4, 27, 25; 23, 24) connected to control conduction of the control transistor (20), said control branch circuits being connected to a common control junction (J) connected to control the control transistor (20), wherein

the voltage sensing branch (4, 26, 27) includes a second secondary transformer winding (4, Y) a rectifier (26) and an auxiliary capacitor (27) connected in a circuit configuration similar to the circuit configuration of the output circuit,

a reference element (25) and means (22, 21) applying the output from said voltage sensing branch circuit to the common control junction (J) of the control transistor (20) when the output voltage rises above the reference voltage as determined by said reference element to control the control transistor (20) to in turn control the main switching resistor (6) to blocked state; and

wherein the second branch comprises a sensing resistor (24) connected in series with the main switching path of the main switching transistor (6) and a coupling circuit (23) connecting a sensing voltage across the sensing resistor (24) and representative of current flow to the common control junction (J) of the control transistor (20).

4,005,352

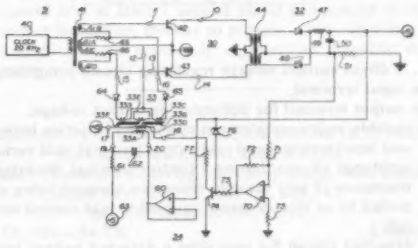
PROTECTION CIRCUIT FOR MAGNETICALLY CONTROLLED D-C TO D-C CONVERTER

Jindrich Kugler; Alfred Dvorak, both of Ottawa, and Charles John Elliott, Kanata, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Apr. 5, 1976, Ser. No. 673,715

Int. Cl.² H02M 3/335

U.S. Cl. 321—19 **5 Claims**



1. In a pulse-width modulated d-c to d-c converter comprising:

a pair of transformer coupled power transistors connected in a push-pull configuration to a source of d-c voltage;

a drive circuit for alternately switching said transistors into conduction;

a transformer having a primary coupled to the output of the drive circuit and a center tapped secondary to the inputs to the pair of power transistors for coupling switching signals from the drive circuit to the transistors;

a rectifier and filter network coupled to the outputs of the pair of power transistors for producing the d-c output voltage of the converter;

a magnetic amplifier having a pair of serially connected gate windings coupled via alternately conducting diodes across at least part of said secondary winding to substantially short-circuit the switching signals to the power transistors during saturation thereof and thereby alter the duty cycle of said signals;

said secondary having a larger winding and a smaller winding connected in series opposition to the input to each of

said power transistors with each larger winding being coupled through said diodes to a separate one of said gate windings;

said magnetic amplifier also having a first control winding for controlling said saturation;

a first control circuit responsive to said d-c output voltage for controlling a first control signal applied to said first control winding to vary the firing angle and hence the saturation interval of said magnetic amplifier so as to maintain a substantially constant output voltage with varying loads;

the magnetic amplifier additionally having a second control winding; and

a second control circuit responsive to the output current of the converter, for controlling a second control signal applied to the second control winding to vary the firing angle and hence the saturation interval of said magnetic amplifier so as to limit said output current.

4,005,353

DIRECT CURRENT VOLTAGE REGULATING CIRCUITRY

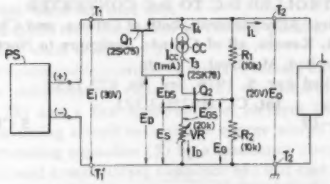
Kenji Yokoyama, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Apr. 23, 1975, Ser. No. 570,964

Claims priority, application Japan, Apr. 25, 1974, 49-47016

Int. Cl.² G05F 1/56

U.S. Cl. 323—22 R **7 Claims**



1. A direct current voltage regulating circuit comprising:

an input terminal;

an output terminal for delivering an output voltage;

a variable resistance element connected in series between said input terminal and said output terminal, said variable resistance element having a control terminal, the internal resistance of said variable resistance element being controlled by an electric signal coupled to said control terminal;

a detecting circuit for providing a detected voltage representing said output voltage; and

a voltage amplifying circuit having an input and an output, and including an FET having a triode characteristic, a constant current circuit serving as the load of said FET, said detected voltage being coupled to the input of said voltage amplifying circuit, the output of said voltage amplifying circuit being connected to the control terminal of said variable resistance element.

4,005,354

ELECTROMAGNETIC POSITION TRANSDUCERS

Anthony Brian Plant, Birmingham, England, assignor to Lucas Industries Limited, Birmingham, England

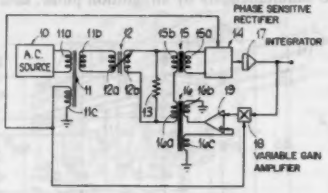
Filed May 7, 1975, Ser. No. 575,178

Claims priority, application United Kingdom, May 11, 1974, 20941/74

Int. Cl.² G01L 9/10

U.S. Cl. 323—51 **3 Claims**

1. An electromagnetic position tranducer of the kind comprising an a.c. source, a variable transformer the coupling of the windings of which is varied in use by movement of a position input element and a phase sensitive detector for producing a d.c. output determined by the position of said position input element, the transducer including an input coupling transformer coupling the a.c. source to the variable transformer, an output coupling transformer with its secondary winding connected to the phase-sensitive rectifier, a feedback transformer having its secondary winding connected in a closed series circuit with the primary winding of the output



coupling transformer and the output winding of the variable transformer, an integrator connected to the output terminal of the phase-sensitive rectifier and a variable gain amplifier driving the primary winding of the feedback transformer, the amplifier producing an a.c. signal derived from said a.c. source and of magnitude dependent on the output of the integrator, whereby in equilibrium there is substantially no voltage across the primary winding of the output coupling transformer.

4,005,355

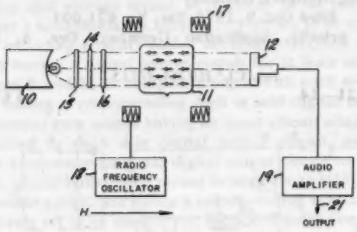
METHOD AND APPARATUS FOR STIMULATING NARROW LINE RESONANCE CONDITIONS

William Happer, 560 Riverside Drive, New York, N.Y. 10027, and Henry Y. S. Tang, 155 E. 93 St., New York, N.Y. 10028

Filed July 9, 1974, Ser. No. 486,863

Int. Cl.³ G01R 33/08

U.S. Cl. 324—.5 F **22 Claims**



1. Apparatus for monitoring polarization induced by optical pumping of a system of quantum mechanical spins in a magnetic field, comprising means for containing a gaseous sample of the spin system in which angular momentum is exchanged between the spins at a rate which is substantially greater than the rate of precession of the spins with respect to the magnetic field together with an inert buffer gas at a pressure sufficient to diminish the optical depth of the spin system, means for polarizing said spin system and means for detecting polarization in said spin system.

4,005,356

IGNITION WAVE ANALYZER INTERFACE

Gerald C. Trussell, Park Ridge, Ill., assignor to Sun Electric Corporation, Chicago, Ill.

Filed June 16, 1975, Ser. No. 587,519

Int. Cl.² F02P 17/00

U.S. Cl. 324—15 **17 Claims**

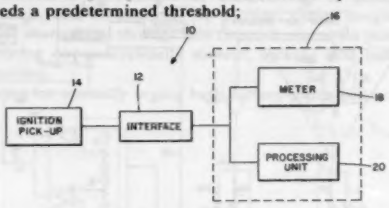
1. In an ignition wave analyzer having coupling means for producing a primary ignition signal and a secondary ignition

signal in response to an automobile ignition system and output means, an interface for interconnecting said coupling means and said output means comprising, in combination:

input means for receiving said secondary ignition signal, said secondary ignition signal having a secondary amplitude;

store means for storing said secondary amplitude of said secondary ignition signal to define a stored amplitude;

comparator means for comparing said secondary amplitude and said stored amplitude, said comparator means generating a command pulse whenever the difference between said secondary amplitude and said stored amplitude exceeds a predetermined threshold;



PSTROB means for generating a signal PSTROB in response to said comparator means;

PSAMP means for generating a signal PSAMP in phase with said primary ignition signal;

first gate means for gating said signal PSTROB* and said signal PSAMP to produce a store command signal;

first controllably conductive means for interconnecting said input means and said store means in response to said store command signal; and

coupling means for interconnecting said output means and said store means.

4,005,357

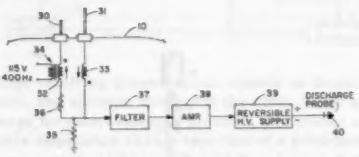
ELECTROSTATIC FIELD SENSOR

Gerald W. Parkinson, Stratford, Conn., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 13, 1976, Ser. No. 658,146

Int. Cl.² G01R *5/28;* **H05F** *3/06*

U.S. Cl. 324—32 **6 Claims**



1. A probe arrangement for determining the magnitude and polarity of the electrostatic charge accumulated on an aircraft, comprising in combination

a pair of unequal length probes insulated from said aircraft and projecting different distances therefrom into the surrounding atmosphere so as to sense the electric field present thereat;

means for energizing said probes with equal and out-of-phase A.C. Voltages,

said voltages being of a sufficient magnitude so as to result in corona currents flowing through said probes in opposite directions when said electric field has zero intensity; and

means for combining said corona currents so as to develop a signal whose amplitude indicates the magnitude of the electrostatic charge accumulated on said aircraft and whose sign indicates the polarity of this accumulated charge.

4,005,358

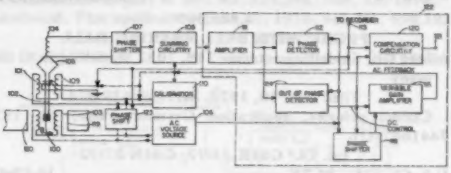
MAGNETOMETER WITH OUT-OF-PHASE CORRECTION

Simon Foner, 31 Payson Terrace, Belmont, Mass. 02178

Filed Oct. 7, 1974, Ser. No. 513,090

Int. Cl.² G01R *33/12*

U.S. Cl. 324—34 R **22 Claims**



1. A magnetometer including:

a sample and predetermined sample environment:

driving means for applying an AC driving signal to said sample and for providing an AC output indication representative of the response of said sample to said driving signal;

said sample and predetermined sample environment being of a type whereby said output indication contains a first signal component indicating magnetic moment of said sample in an expected phase relationship with the n'th harmonic (where n is a positive integer) of said driving signal and at least one second signal component, out of phase with said first signal component and not correspondingly representative of magnetic moment of said sample;

means for substantially compensating for said at least 1 second signal component in said output indication comprising:

detector means responsive to said at least 1 second signal component for providing in response to said second signal component an output signal indicating said at least 1 second signal component;

correction means operative in response to said detector output signal and said output indication to substantially cancel said at least 1 second signal component in said output indication, thereby to provide a corrected output indication more accurately representing magnetic moment.

4,005,359

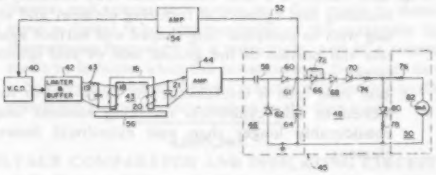
RESONANT FREQUENCY MEASURING DEVICE FOR GAUGING COATING THICKNESS

William N. Smoot, 9 E. Irving St., Chevy Chase, Md. 20015

Filed Nov. 7, 1975, Ser. No. 629,742

Int. Cl.² G01R *33/00, 33/12*

U.S. Cl. 324—34 TK **4 Claims**



1. An electronic coating guage for measuring the thickness of a coating on a conductive, non-magnetic or magnetic substrate comprising:

double-tuned over-coupled transformer means with a primary and a secondary winding each tuned to the same frequency, said transformer means having a U-shaped core which is adapted to have its open face flush with the coating of the substrate to be tested;

A.C. input means for applying an A.C. signal to said primary winding; and

means for measuring the voltage response at said secondary winding of said transformer means;

said measuring means providing changes in the resonant frequency response characteristics of said transformer, which changes are indicative of the thickness of said coating.

4,005,360

PROBE WITH BALL BEARING BALL

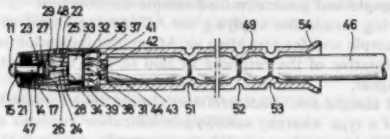
Albert Ott, Sindelfingerstrasse 118, 7032 Sindelfingen 6, Germany

Filed Dec. 10, 1975, Ser. No. 639,574

Claims priority, application Germany, Dec. 14, 1974, 7441607[U]

Int. Cl.² G01R *33/12*; G01N *27/72*

U.S. Cl. 324—34 TK **16 Claims**



1. A probe having a soft magnetic pole piece and a magnetizable carrier, for measuring the thickness of thin non-ferromagnetic layers on a ferromagnetic base by substantially detecting the reluctance of said thin layers between said base and said pole piece,

said pole piece comprising a spherical sector comprised of a ball bearing ball having a flat side provided by grinding and an elongated fastening element connected to the ground side of said spherical sector and being interchangeably fastened to said magnetizable carrier,

said magnetizable carrier carrying transmission coil means for generating an a.c. magnetic field penetrating through the non-ferromagnetic layer and into the ferromagnetic base therebelow and for generating an electric response signal depending on the thickness of said thin non-ferromagnetic layer,

wherein,

a. said fastening element is a cylindrical pin having a flat end surface, which is coaxial with said spherical sector and connected thereto by solder between the ground side of said spherical sector and said flat end surface of said pin, the crystalline structure of said spherical sector being substantially maintained the same as that of the original ball bearing ball, a rim portion of the ground side of said spherical sector projecting beyond the end surface of said cylindrical pin,

b. said carrier is a thin-walled steel tube coaxially surrounding said cylindrical fastening element and abutting with its complete ring-shaped end surface against said rim portion of the ground side of said spherical sector, and

c. said steel tube is interchangeably force-and/or form-locked to said cylindrical fastening element and is considerably longer than said cylindrical fastening element.

4,005,361

PERFORMANCE ASSURANCE APPARATUS FOR PHASED ANTENNA ARRAY DRIVES

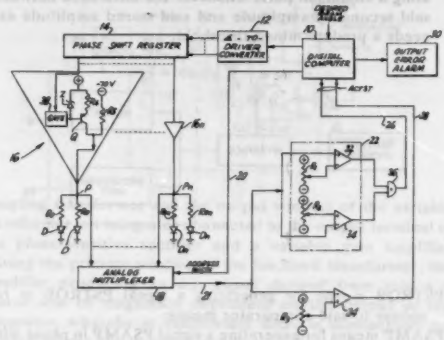
David S. Lerner, Fanwood, N.J., assignor to Lockheed Electronics Co., Inc., Plainfield, N.J.

Filed Nov. 4, 1975, Ser. No. 628,464

Int. Cl.² G01R *31/02*

U.S. Cl. 324—51 **5 Claims**

1. In an r.f. phase shift system including a plurality of diodes, digital phase shift specifying means for supplying a binary signal specifying bias states for said diodes, and means for selectively biasing said diodes to operate in one of a conducting and a nonconducting state to bring about a predetermined r.f. phase shift in response to the phase shift dictated by said phase shift specifying means, each of said diodes exhibiting characteristic first and second potentials when biased to said conducting and nonconducting states, a monitoring circuit for determining whether said diodes are properly biased to bring about said predetermined phase shift, said monitoring circuit comprising means coupled to each of said diodes for sensing the bias state indicating characteristic potential there across, means coupled to said sensing means for producing a



diode bias state indicating first additional binary signal corresponding to said obtaining characteristic potential, means coupled to said first additional binary signal producing means and to said phase shift specifying means for comparing said first additional binary signal with said binary signal corresponding to the desired bias condition at said diodes to achieve a predetermined phase shift, and indicating means connected to said comparing means to provide a warning indication upon the sensing of a lack of correspondence between said binary signal and said first additional binary signal.

4,005,362

ELECTRICAL CIRCUIT CONTINUITY TESTER

Samuel S. Fortino, 24 Lisa Drive, Dix Hills, N.Y. 11746

Filed Jan. 26, 1976, Ser. No. 652,544

Int. Cl.² G01R *31/02, 1/06*

U.S. Cl. 324—51 **5 Claims**

1. An electrical circuit continuity tester of the battery employing type comprising:

a cylindrical tube of insulating material dimensioned radi-

ally and longitudinally to receive at least one standard battery;

a needle contact mounted in and extending from one end of said cylindrical tube forming a first probe;

a longitudinal slit communicating with the other end of said cylindrical tube and running longitudinally therefrom for a predetermined distance, said slit including at the closed end thereof a circumferential communicating portion;

a bulb having cylindrical and button electrodes;

a cylindrical-electrode clip circumferentially embracing at least 180° of the bulb arc electrode and including integral therewith a second probe, dimensioned to protrude through said longitudinal slit portion sliding longitudinally thereof and through said circumferential slit portion rotating circumferentially thereof, locking said bulb in position;

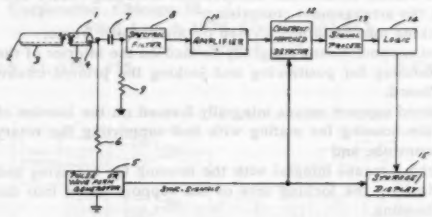
a spring for normally urging bulb-battery-probe contact.

4,005,363

RANGE RESOLVING GROUND LINE SENSOR

Ralph W. Mifflin, Rome, N.Y., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Oct. 22, 1974, Ser. No. 516,932
Int. Cl.² G01R 27/04
U.S. Cl. 324—58.5 B **3 Claims**



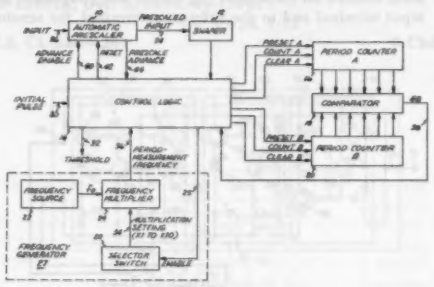
1. A range resolving ground sensor system to detect pressure, seismic, and acoustic changes in the earth, water and air and the range for each change of pressure, comprising a pressure sensitive-impedance change type line of a predetermined length incorporated in the earth, said line having first and second conductors, means to generate a predetermined time resolving waveform of bias voltage said time resolving waveform being of the time limited pulse type, said time resolving waveform being received by said first and second conductors for propagation down and back along said first and second conductors to provide a time history of the impedance changes as a function of distance along said first and second conductors, a detector receiving an amplitude and phase modulated signal output from said line representative of a pressure or disturbance change of said earth, said detector simultaneously receiving said predetermined time resolving waveform for synchronous purposes, means for displaying a visual sweep, said display means receiving a synchronizing signal from said means to generate said predetermined time resolving waveform for initiation of said visual sweep, said display means also receiving the detected signal to also be displayed on said visual sweep, the position upon said sweep of said detected signal being a measure of the range of the change of pressure or a disturbance along said line.

4,005,364

DIGITAL CIRCUIT FOR MEASURING RELATIVE FREQUENCY IN SEPARATE PULSE TRAINS

Timothy M. Harrington, Sierra Madre, Calif., assignor to MDH Industries, Inc., Monrovia, Calif.

Continuation-in-part of Ser. No. 524,368, Nov. 15, 1974, abandoned. This application June 21, 1976, Ser. No. 698,103
Int. Cl.² H03K 5/18; G01R 23/10
U.S. Cl. 324—79 D **14 Claims**



1. A digital circuit for measuring when and if the instantaneous frequency of a pulse train, by which is meant the reciprocal of the time between individual pulses in the same pulse train, bears a selected relationship to the maximum instantaneous frequency of a previous pulse train, comprising:

a. prescaler means having an adjustable scaling factor, which can be automatically varied such that the instantaneous frequency of the output pulse train from the prescaler in response to an input pulse train with a wide range of instantaneous frequencies is less than a predetermined maximum, and having storage for the value of said scaling factor so that the same scaling factor can be used with subsequent pulse trains;

b. frequency-generating means for generating pulses with a single repetition frequency selected from a multiplicity of possible frequencies;

c. digital period-measurement means for measuring and storing the value of the time interval between individual pulses produced at the prescaler-means output, said measurement using the frequency of the pulses produced at the output of the frequency-generating means;

d. comparator means for comparing the stored and measured values within the digital period-measurement means; and

e. control means for operating the prescaler means, frequency-generating means, digital period-measurement means, and comparator means in a first mode to determine a digital value representative of the maximum instantaneous frequency in a pulse train, and in a second mode to indicate when the instantaneous frequency in a subsequent pulse train bears a selected relationship to the maximum frequency determined in the first mode.

4,005,365

VOLTAGE COMPARATOR AND INDICATING CIRCUIT

Robert L. Berger; William H. Hailey, both of Kansas City; George Mallick, Jr., Ellisville; Donald H. Mannbeck, St. Charles, and Wilber J. Weight, Lee's Summit, all of Mo., assignors to Western Electric Company, Inc., New York, N.Y.

Filed Mar. 26, 1975, Ser. No. 562,322
Int. Cl.² G01R 31/02, 19/14, 19/16
U.S. Cl. 324—133 **7 Claims**

1. A device for comparing and indicating the polarity of voltages with respect to a reference range about a reference voltage, which comprises:

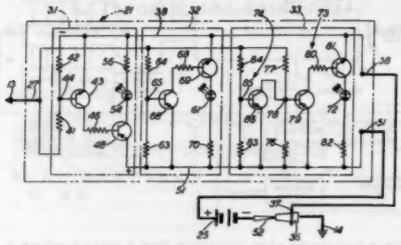
means for supporting electrical circuit elements;

an input terminal located on the supporting means;

a reference terminal located on the supporting means;

a first circuit means, including a first indicator element located on the supporting means and coupled to the input terminal and to the reference terminal, for sensing and indicating the presence at the input terminal of a voltage applied to the input terminal which is at least as positive as a first voltage value, the first voltage value being positive with respect to the reference voltage applied at the reference terminal;

a second circuit means, including a second indicator element located on the supporting means and coupled to the input terminal and to the reference terminal, for sensing



and indicating the presence at the input terminal of a voltage applied to the input terminal which is at least as negative as a second voltage value, the second voltage value being negative with respect to the reference voltage applied at the reference terminal; and

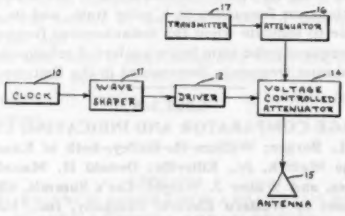
a third circuit means, including a third indicator element located on the supporting means and coupled to the input terminal and to the reference terminal for sensing and indicating the presence at the input terminal of a voltage applied to the input terminal which falls within the reference range, the reference range encompassing the first and the second voltage values.

4,005,366

SYSTEM TO SIMULATE MOTION AND PLASMA INDUCED SIGNAL VARIATIONS FROM REENTRY VEHICLES

Joseph L. Poirier, Chelmsford, and David H. Tropea, Brocton, both of Mass., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Aug. 18, 1975, Ser. No. 605,578
Int. Cl.² G0CB *9/02*
U.S. Cl. 325—67 **3 Claims**



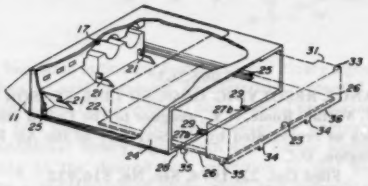
1. A system to simulate motion and plasms induced variations in the attenuation of signals transmitted from a reentry vehicle being comprised of means to generate RF power for transmission, a voltage controlled attenuator having first and second inputs and an output, a transmitting antenna connected to said output of said voltage controlled attenuator, fixed attenuator means interconnecting said means to generate RF power and said first input of said voltage controlled attenuator to provide a predetermined magnitude of RF power to said voltage controlled attenuator to simulate attenuation due to range and average reflection loss due to plasma, clock means providing a predetermined output waveform and having a frequency corresponding to the spin rate of said reentry vehicle, wave shaping means to modify the predetermined clock output waveform to produce a voltage waveform whose amplitude as a function of time duplicates the fast cyclical variations attributable to said reentry vehicle, driver means interconnecting the wave shaping means and said second input of said voltage controlled amplifier to provide additional predetermined wave shaping to include polarization effects and to establish predetermined bias levels to control the instantaneous level of said voltage controlled attenuator and thus the RF power radiated from said transmitting antenna.

4,005,367

MOBILE TRANSCEIVER HOUSING ASSEMBLY

Arnold Vincent Dano, Park Ridge, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Nov. 3, 1975, Ser. No. 627,988
Int. Cl.² H04B *1/08*
U.S. Cl. 325—352 **8 Claims**



1. An improved housing arrangement for mobile electronic apparatus having a resilient housing, a printed circuit board, a frame for supporting the printed circuit board and a multiplicity of electro-mechanical components including rotary controls, the arrangement comprising:

locking tabs integrally formed on the support frame;

first support means integrally formed on the interior of the housing for positioning and locking the printed circuit board;

second support means integrally formed on the interior of the housing for mating with and supporting the rotary controls; and

locking means integral with the housing for receiving and locking the locking tabs of the support frame into the housing.

4,005,368

MEMORY TUNING SYSTEM WITH AUTOMATIC TWO SPEED DISPLAY

Akio Tanaka, Chicago, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.

Filed Jan. 5, 1976, Ser. No. 646,720
Int. Cl.² H04B *1/16*
U.S. Cl. 325—455 **11 Claims**

1. A television tuning system including:

counting means, generating sequential channel numbers for tuning all channels;

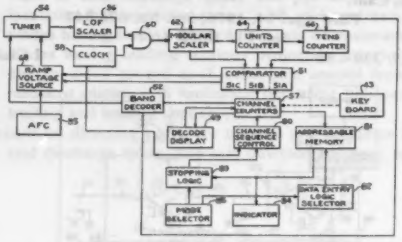
read/write memory means coupled to said counting means accessed by said generated channel numbers and having a plurality of addressable locations for storage and recall of signals related to selected channel numbers;

mode selection means coupled to said counting means and said memory means for establishing a program mode for storage of said signals and an operate mode for recall from said memory means of said signals to cause tuning to channels corresponding to the addresses of individual locations of said memory means;

clock means producing timing pulses at regular intervals;

counting pulse means coupled to said clock means generating counting pulses at two distinct predetermined rates; and

channel skip control means, coupled between said counting pulse means and said counting means and responsive to said signals in said memory means, in said operate mode,



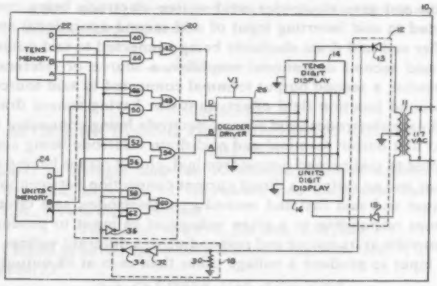
for increasing the counting speed of said counting means from the slower to the faster of said rates whenever non-selected channel numbers are generated by said counting means and for decreasing the counting speed of said counting means from the faster to the slower of said rates whenever selected channel numbers are generated by said coun.ing means.

4,005,369

AC LINE MULTIPLEXING FOR A MULTI-DIGIT DISPLAY SYSTEM

Wilbert Parisoe, Highland Park, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.

Filed Aug. 4, 1975, Ser. No. 601,562
Int. Cl.² H04B 1/16
U.S. Cl. 325—455 **5 Claims**



1. In a television receiver deriving power from a single phase source of AC line voltage, a multi-digit display system comprising:

a pair of display devices corresponding to the tens and units digits of two digit channel numbers;

circuit means including rectification means utilizing the positive and negative portions of said single phase AC line voltage to generate two half-wave rectified AC timing voltages 180° out-of-phase for selective activation of said two display devices;

a source of digital information; and

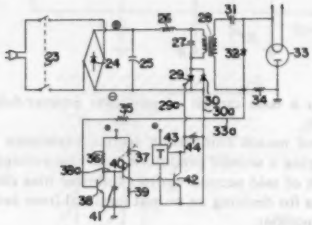
multiplex means coupled to said source of digital information for supplying said digital information in synchronism with the activation of individual ones of said tens and units display devices.

4,005,370

POWER SUPPLY MEANS FOR MAGNETRON

Shigeru Kusunoki, Yamato-Koriyama; Teruhisa Takano, Osaka; Hirofumi Yoshimura, Nara, and Noboru Kurata, Yamato-Koriyama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Sept. 2, 1975, Ser. No. 609,727
Claims priority, application Japan, Sept. 10, 1974, 49-104495; Sept. 10, 1974, 49-104496; Dec. 3, 1974, 49-139316; Dec. 3, 1974, 49-139317
Int. Cl.² H03K 1/12
U.S. Cl. 328—267 **9 Claims**



1. Magnetron power supply means for supplying converted AC power to a magnetron from a source of AC power comprising:

a. rectifying means connected to said AC power source for rectifying said AC power to DC power;

b. frequency converting means having at least one set made up of a resonant circuit and at least one thyristor switching circuit, and which frequency converting means is connected to said rectifying means;

c. a step-up transformer having the primary side thereof connected to said resonant circuit;

d. said magnetron being connected to the secondary side of said step-up transformer;

e. an energizing transformer having the primary side connected to said AC power source and the secondary side connected to said magnetron for heating said magnetron;

f. a power regulator including an adjustable reference circuit and coupled to said frequency converting means for controlling the power produced from said frequency converting means to a predetermined amount established by said adjustable reference circuit; and

g. signal generating means coupled in said magnetron power supply means for generating a signal having a value proportional to the value of said converted AC power supplied to said magnetron, and having the output coupled to said power regulator for supplying said signal to said power regulator for controlling said power regulator for increasing the power produced from said frequency converting means when said signal is below the reference level determined by said adjustable reference circuit and decreases said power when said signal is above said reference level.

4,005,371

BIAS CIRCUIT FOR DIFFERENTIAL AMPLIFIER

Masayuki Hongu, Komae, and Masahiro Tada, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed July 1, 1975, Ser. No. 592,215
Claims priority, application Japan, July 19, 1974, 49-83069
Int. Cl.² H03F 3/45
U.S. Cl. 330—30 D **5 Claims**

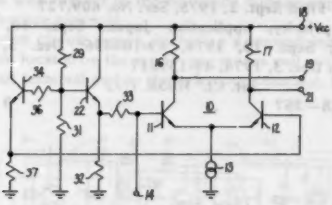
1. A circuit comprising:

A. a differential amplifier comprising first and second differentially connected transistors, each having an input electrode, said input electrode of said first transistor comprising a signal input terminal for said differential amplifier;

B. a first emitter-follower bias circuit and first resistance means connecting said bias circuit to said input electrode of said first transistor;

C. a second emitter-follower bias circuit connected to said input electrode of said second transistor;

D. first means for supplying a first predetermined bias voltage to a base circuit of said first emitter-follower bias circuit;



E. second means comprising second resistance means for supplying a second predetermined bias voltage to a base circuit of said second emitter-follower bias circuit; and

F. means for deriving an output terminal from said differential amplifier.

4,005,372

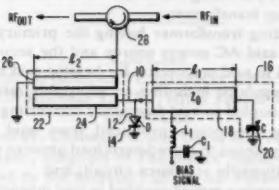
FREQUENCY TUNABLE MICROWAVE APPARATUS HAVING A VARIABLE IMPEDANCE HYBRID IDLER CIRCUIT

Pang-Ting Ho, Lawrenceville, and Arye Rosen, Camden, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Jan. 26, 1976, Ser. No. 652,162

Int. Cl.² H03F 3/10

U.S. Cl. 330—34 **8 Claims**



1. A broad-band frequency tunable microwave apparatus of the type including a transmission line, a semiconductor element in said line for generating, in response to a threshold signal, a microwave signal having fundamental, second and third harmonically related frequency components, means for applying said threshold signal to said semiconductor element, and output means to provide a substantially resistive impedance electrically connected to said semiconductor element for transmitting a signal component at the second harmonic frequency to a terminating load impedance, wherein the improvement comprises:

a variable input impedance idler circuit connected in parallel with said semiconductor element including a distributed transmission line having a predetermined characteristic impedance serially connected to a lumped variable capacitor connected to ground, said input impedance of said idler circuit being substantially reactive and determining the fundamental and harmonic frequencies of said apparatus,

said fundamental frequency and its harmonics being tunable over a selected frequency range by changing the input circuit impedance of said idler circuit by varying the capacitance of said variable capacitor,

whereby said apparatus provides said microwave signal to said terminating load impedance only at said second harmonic frequency throughout the tunable frequency range.

4,005,373

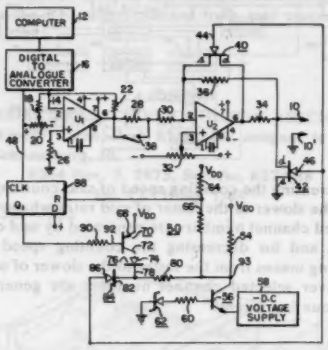
TRANSIENT ELIMINATION CIRCUIT

Emery Salesky, Denville, and Kent W. Luehman, Parsippany, both of N.J., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Apr. 14, 1976, Ser. No. 676,847

Int. Cl.² H03F 1/14

U.S. Cl. 330—51 **2 Claims**



1. In a direct current amplifier comprising in combination a first operational amplifier having at least one input and an output, a second operational amplifier having an inverting input, a non-inverting input and an output, means providing a direct current path having a predetermined resistance between the output of said first operational amplifier and the said inverting input of said second operational amplifier, a first output terminal, a first resistor connected between said output of said second operational amplifier and said output terminal, a second resistor connected between said inverting input terminal of said second operational amplifier and said output terminal, a first junction field effect transistor having source, drain and gate electrodes, said source electrode being connected to said inverting input of said second operational amplifier and said drain electrode being connected to said output of said second operational amplifier, a source of reference potential, a second output terminal connected to said source, a second junction field effect transistor having source drain and gate electrodes, said source electrode being connected to said first output terminal and said drain electrode being connected to said second output terminal, circuit means having an input and an output, a direct current connection between said output and said first and second gate electrodes, said circuit means responding to a given voltage at its input to produce zero volts at its output and responding to a different voltage at its input to produce a voltage other than zero at its output.

4,005,374

PULSED GAS LASER WITH LOW-INDUCTANCE FLOW-THROUGH ELECTRODES

Jeffrey I. Levatter, Palo Alto, and Shao-Chi Lin, La Jolla, both of Calif., assignors to Xonics, Inc., Van Nuys, Calif.

Filed Mar. 31, 1975, Ser. No. 563,713

Int. Cl.² H01S 3/097, 3/22

U.S. Cl. 331—94.5 PE **13 Claims**

1. A low inductance discharge electrode assembly for an electrically pumped pulsed electrical discharge laser having an optical axis, including in combination:

a set of blade shaped upstream electrodes;

a set of blade shaped downstream electrodes;

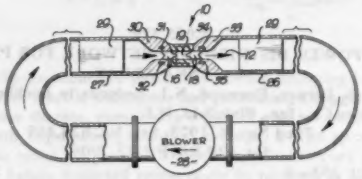
means for mounting said upstream electrodes in parallel

spaced relation substantially perpendicular to said optical axis to form an upstream electrode array;

means for mounting said downstream electrodes in parallel spaced relation substantially perpendicular to said optical axis to form a downstream electrode array;

means for mounting said arrays on opposite sides of said optical axis with a discharge space therebetween including spaced electrical insulator plates defining opposite walls of said discharge space and providing electrical insulation between said arrays, with said upstream electrodes having trailing sections and said downstream electrodes having leading sections projecting into said discharge space toward each other and spaced from said insulator plates, with ionization occurring between said trailing and leading sections;

means for directing a gas flow through said upstream array, said discharge space, and said downstream array including an electrically conducting upstream tube with opposing generally flat surfaces and an electrically conducting downstream tube with opposing generally flat surfaces;



said blade shaped electrodes having a length-to-thickness ratio of at least 10 to 1, where the length is measured along the gas flow path;

an electrical insulator overlying said tubes;

a first electrical conducting sheet on the corresponding flat surfaces of said upstream and downstream tubes and the insulating plate therebetween;

a second electrically conducting sheet on the flat surfaces of said upstream and downstream tubes and the insulating plate therebetween opposing said first sheet; and

means for connecting an electrical pulse power supply across said arrays to provide electrical discharges between said upstream and downstream electrodes across said discharge space.

4,005,375

DEVICE INCLUDING FERRIMAGNETIC COUPLING ELEMENT

Robert D. Pringle, and Ian F. Morton, both of Edinburgh, Scotland, assignors to Microwave and Electronic Systems Ltd., Newbridge, Scotland

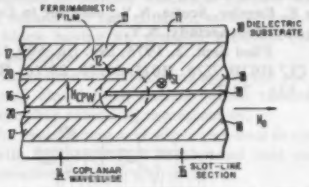
Filed Dec. 9, 1974, Ser. No. 531,124

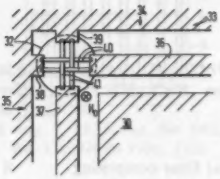
Claims priority, application United Kingdom, Dec. 7, 1973, 56944/73

Int. Cl.² H01P *1/16, 5/00, 5/08*

U.S. Cl. 333—21 R **16 Claims**

1. A radio frequency coupling device comprising a non-magnetic, dielectric, single crystal substrate; a film of single crystal ferrimagnetic material epitaxial with said substrate and located at a substrate surface essentially co-planar therewith; first and second surface-oriented transmission line sections formed on said substrate surface and having respective end portions thereof overlying said ferrimagnetic film, said film of ferrimagnetic material when subjected to a biasing direct magnetic field serving to couple the magnetic fields of such first and second surface-oriented transmission line sections, said end portions being terminated to present an RF discontinuity therebetween which prevents significant mutual coupling directly between said first and second transmission line sections, and said end portions cooperating with said ferrimagnetic film in the presence of said biasing magnetic field to couple thereto and establish a reciprocal RF coupling between





said first and second transmission line sections at a frequency dependent on said biasing magnetic field.

4,005,376

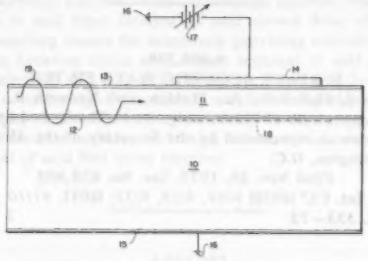
ELECTRONICALLY VARIABLE SURFACE ACOUSTIC WAVE PHASE SHIFTER

Kenneth L. Davis, Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 15, 1976, Ser. No. 677,191

Int. Cl.² H03H *9/30;* **H01L** *41/08, 29/76*

U.S. Cl. 333—30 R **5 Claims**



1. An electrically variable surface acoustic wave phase shifter which comprises:

a substrate formed of a semiconductor material and having an upper and lower face;

a bottom electrode covering the bottom face of said substrate;

a thin film of electrically insulating material on the upper face of said substrate;

a layer of piezoelectric material deposited onto said thin film of insulating material on said substrate;

an upper electrode electrically connected with and covering a portion of said piezoelectric layer; and

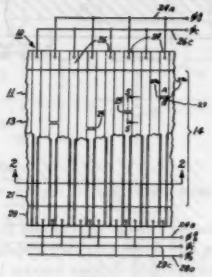
a variable voltage source for applying a dc bias connected between said upper electrode and said bottom electrode.

4,005,377

CONDUCTIVITY COUPLED SPLIT CAPACITOR SIGNAL PROCESSING DEVICE AND APPARATUS THEREFOR

William E. Engeler, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Sept. 2, 1975, Ser. No. 609,414
Int. Cl.² H03H 7/28; H01L 29/78, 29/10; H03K 25/02
U.S. Cl. 333—70 T 8 Claims



1. A transversal filter comprising

a substrate of one conductivity type semiconductor material,

a plurality of electrodes insulatingly overlying said substrate and forming therewith a plurality of stages of a charge transfer shift register, one electrode of each of said stages being split into a first and a second part with a gap therebetween, a region of opposite conductivity type underlying a portion of each of said gaps to couple electrically the pair of storage regions underlying the first and second parts of respective ones of said electrodes,

a first clock line connected to said first parts of said one electrodes,

a second clock line connected to the second parts of said one electrodes,

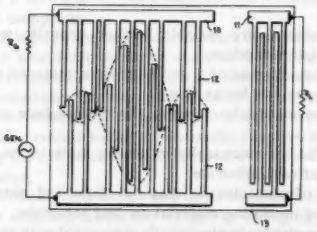
means for applying phase related voltages to each of the stages of said shift register to effect transfer of charge from stage to stage, the same phase related voltage being applied to said first and second clock lines.

4,005,378

SURFACE ACOUSTIC WAVE FILTER

Andrew J. Slobodnik, Jr., Malden, and Kenneth R. Laker, Arlington, both of Mass., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Nov. 25, 1975, Ser. No. 635,005
Int. Cl.² H03H 9/04, 9/26, 9/32; H01L 41/10
U.S. Cl. 333—72 2 Claims



1. A surface acoustic wave filter transducer having $4(f_o\tau)+2$ interdigital fingers and finger overlap coefficients H_o [N] determined by the equation

$$H_o[N] = \left\{ \frac{\sin \pi BN/2f_o}{\pi N/2f_o} + \frac{2K\cos \pi BN/2f_o}{K^2+(\pi N/f_o)^2} - \frac{(2\pi N/f_o)\sin \pi BN/2f_o}{K^2+(\pi N/f_o)^2} \right\} \left\{ \frac{I_o[W_o]\sqrt{\tau^2-(N/2f_o)^2}}{I_o[W_o\tau]} \right\}$$

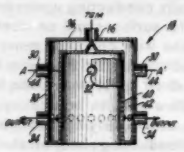
wherein N is the number of gaps between interdigital fingers τ is the filter time length parameter, f_o is the filter center frequency, B is the filter bandwidth, K is the transistor bandwidth fall off parameter, I_o is a modified Bessel function of the first kind and zero order and W_o is the ripple reduction parameter.

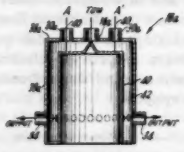
4,005,379

R.F. POWER DISTRIBUTION NETWORK FOR PHASED ANTENNA ARRAY

David S. Lerner, Fanwood, N.J., assignor to Lockheed Electronics Co., Inc., Plainfield, N.J.

Filed Nov. 4, 1975, Ser. No. 628,469
Int. Cl.² H01P 5/12, 7/06
U.S. Cl. 333—6 5 Claims





1. An r.f. power distribution network comprising a source of an r.f. input signal, means for dividing said input signal into a first signal and a second signal, a cavity resonator having first and second inlet port means, means for respectively applying said first and second signals to said first and second inlet port means, said cavity resonator being in the form of a first generally cylindrical member having a first annular upper wall and a first circumferential wall depending from said first annular upper wall, a second generally cylindrical member disposed within said first cylindrical member, said second cylindrical member having a second upper annular wall within said first cylindrical member and substantially parallel to said first annular wall and a second circumferential wall depending therefrom and coaxial with said first circumferential wall, the diameter of said second circumferential wall being the greater part of the diameter of said first circumferential wall, and wall means for connecting the ends of said first and second circumferential walls remote from said first and second upper walls, said first inlet port means being centrally formed on one of said upper walls, and said second inlet port means comprising a plurality of ports formed on one of said first upper wall and said first circumferential wall, and a plurality of spaced outlet ports arranged about the periphery of said first circumferential wall and axially spaced from said first and second inlet ports.

4,005,380

CLIP-ON INDUCTIVE PULSE PICK-UP

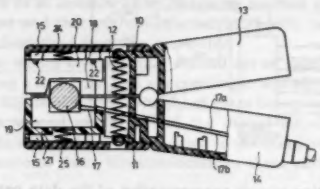
Wolfgang Hellmann, Weinstadt; Kurt Groetzner, and Bernhard Frohnwieser, both of Stuttgart, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed May 19, 1976, Ser. No. 687,748

Claims priority, application Germany, June 12, 1975, 2526302; Feb. 20, 1976, 2606868

Int. Cl.² H01F 15/04, 27/26

U.S. Cl. 336—84 5 Claims



1. A clip-on inductive pulse detector for detecting current pulses in an electric conductor and generating a trigger pulse in response thereto, comprising a pair of clip jaw shells provided with clip-opening handles, a hinge, a first spring arranged to move the jaw shells together, a ferrite core in two separate halves mounted respectively in recesses in said respective jaw shells, said core halves being shaped so as to fit together and to surround an electric conductor when said jaw shells are closed thereover, and a winding provided on said ferrite core having leads for connection to an electrical circuit, and also comprising the improvement wherein:

at least one of said core halves (18, 19) is mounted with a compression spring (24 and/or 25) held between it and the jaw shell in which it is mounted and is movable against said compression spring by the force of said first spring (12) when the jaw shells (10, 11) are closed together.

4,005,381

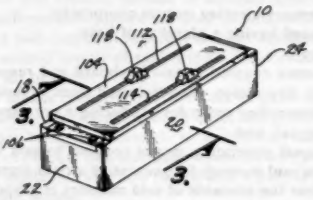
SLIDE POTENTIOMETER

Robert F. Klug, Hemet, Calif., assignor to Dale Electronics, Inc., Columbus, Nebr.

Filed June 9, 1975, Ser. No. 585,092

Int. Cl.² H01C 10/00

U.S. Cl. 338—119 9 Claims



1. A slide potentiometer comprising,

an elongated housing having opposite ends, a bottom, an interior compartment and an open upper end communicating with said interior compartment,

a flat support member positioned in said interior compartment and having opposite sides and opposite ends,

an elongated resistance means on one side of said flat support member,

an elongated collector means on said one side of said flat support member parallel to and spaced from said resistance means,

first and second terminals electrically connected to the opposite ends of said resistance means,

a third terminal electrically connected to said collector means,

a wiper block slidably mounted in said interior compartment and having first and second electrically connected wiper elements in slidable electrical contact with said resistance means and said collector means respectively,

said wiper block having an actuator member extending upwardly therefrom,

a cover means secured to said housing upper end and having an elongated slot formed therein which receives said actuator member extending therethrough,

and means for maintaining said wiper elements in electrical contact with said resistance means and said collector means respectively,

said housing bottom having an elongated slot formed therein,

said flat support member having a lower end portion extending downwardly through said elongated slot.

4,005,382

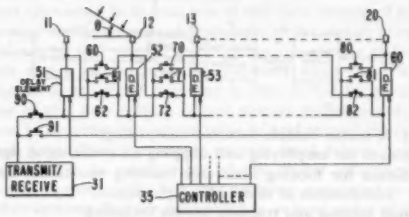
SIGNAL PROCESSOR FOR ULTRASONIC IMAGING

William L. Beaver, Los Altos Hills, Calif., assignor to Varian Associates, Palo Alto, Calif.

Filed Aug. 7, 1975, Ser. No. 602,700

Int. Cl.² G01S 9/66, 3/80

U.S. Cl. 340—1 R 7 Claims



1. An ultrasonic imaging system comprising first and second electromechanical transducer elements, first and second electronic variable delay elements, each delay element having an input terminal and an output terminal, said first transducer element being connected to said input terminal of said first delay element and said second transducer element being connected to said input terminal of said second delay element, and switching means for selectively providing electrical connection between either said output terminal of said second delay element and said input terminal of said first delay element, or said output terminal of said first delay element and said input terminal of said second delay element, or said output terminal of said second delay element and said output terminal of said first delay element.

4,005,383

CATACOUSTIC NAVIGATING SYSTEM

Phillip R. Anderson, Ellicott City, and Robert P. van Eepoel, Catonsville, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 12, 1960, Ser. No. 8,471

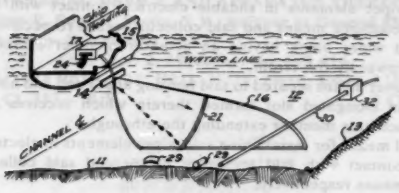
Int. Cl.² G01S 9/66

U.S. Cl. 340—3 R 1 Claim

1. A channel defining system for aiding the navigation through a body of water of a vessel equipped with a high resolution pulsed catacoustic system adapted to scan the bottom in range abeam of the vessel comprising

an elongated buoyant ridge-like strip of acoustic reflecting material extending lengthwise of the channel on the channel bottom and laterally spaced from the center line of

the channel by a substantially constant known distance, and



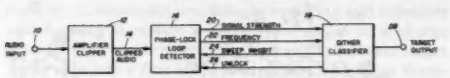
anchoring weights secured to said strip at spaced positions along its length.

4,005,384

VEHICLE DETECTOR

Cabell N. Pryor, Jr., Silver Spring, Md.; Edward Hug, McLean, Va., and Michael H. Stripling, Silver Spring, Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 14, 1970, Ser. No. 8,158
Int. Cl.² G08B *13/00*
U.S. Cl. 340—15 **9 Claims**



1. A motor vehicle detector comprising:

means for amplifying and clipping an audio input signal,

means for locking onto and tracking prominent spectral components of said audio input signal,

said locking and tracking means including

means for producing a first signal representing the signal-to-noise ratios of said prominent spectral components,

means for producing a second signal representing the frequency fluctuations of said prominent spectral components; and

classifying means coupled to said locking and tracking means for producing a detected target output only if said first and second signals possess a selected temporal relationship.

4,005,385

PATTERN RECOGNITION MACHINE FOR ANALYZING LINE ORIENTATION

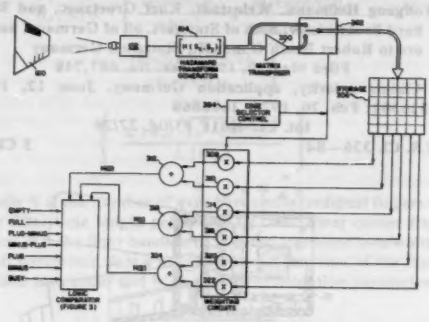
Reuben E. Joynson, Alplaus; Joseph L. Mundy, Schenectady, both of N.Y., and Ranan Banerji, Philadelphia, Pa., assignors to General Electric Company, Schenectady, N.Y.

Filed June 23, 1975, Ser. No. 589,432
Int. Cl.² G06K *9/00*
U.S. Cl. 340—146.3 AE **22 Claims**

1. A machine for classifying peripheral pattern characteristics in two dimensional scene data, comprising in combination:

means responsive to electrical signal representative of two dimensional scene data and for producing therefrom a zeroth-coefficient signal representative of a one dimensional Hadamard transform coefficient of sequency zero from data patterns along a peripheral segment of said scene data, a first-coefficient signal representative of a one dimensional Hadamard transform coefficient of sequency one from data patterns along said peripheral scene segment, and a second-coefficient signal representative of a one dimensional Hadamard transform coefficient of sequency two from data patterns along said peripheral scene segment; and

a logic means connected for comparing the values of said zeroth-coefficient signal, said first-coefficient signal, and said second-coefficient signal with a plurality of signals of known value and for producing therefrom pattern classifi-



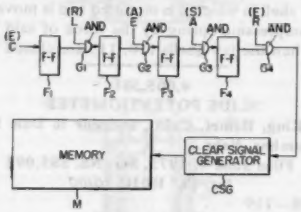
cation signals representative of the data patterns in said peripheral scene segments.

4,005,386

CLEARING SYSTEM

Mitsuaki Seki, Tokyo, and Tamotu Nakazawa, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 19, 1975, Ser. No. 578,420
Claims priority, application Japan, May 21, 1974, 49-56935; May 12, 1975, 50-56999
Int. Cl.² G08F *7/38*; G06F *1/00*
U.S. Cl. 340—172.5 **8 Claims**



1. A memory clearing system comprising:

a keyboard having a plurality of keys;

a memory;

logic means coupled to said keyboard and responsive only to the depression of preselected ones of said keys in a predetermined order for producing a corresponding output signal; and

clear signal generating means coupled to said logic means and to said memory for generating a clear signal operative to clear the contents of said memory in response to said output signal.

4,005,387

COMPUTER CONTROL SYSTEM

William M. Herring, Campton Township, Kane County, and Dennis B. Walling, Darien, both of Ill., assignors to Standard Oil Company, Chicago, Ill.

Continuation-in-part of Ser. No. 514,495, Oct. 15, 1974, Pat. No. 3,968,487. This application Dec. 22, 1975, Ser. No. 643,350
Int. Cl.² G06F *15/46, 3/00*
U.S. Cl. 340—172.5 **16 Claims**

1. A computer control system, useful at a local area to translate digital control information from an online computer located at a remote area into operations of devices of process

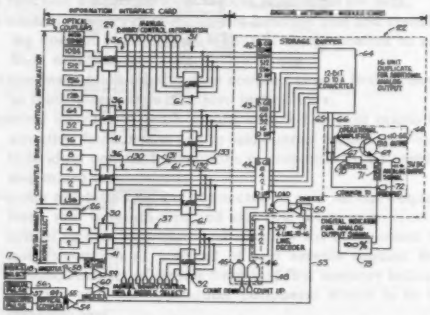
equipment at the local area and useful to translate digital control information provided by manual operation of an entry station at the local area, which comprises:

an information interface means including:

first gate means comprising a first set of gates, each gate having a first input and a second input and an output, said first inputs of said first set of gates being connectable to a first set of bits of a digital information output channel of a bus connected to the computer and at least some of these bits connected to additional systems, that are at the local area or at another area containing another process equipment and that are constructed to receive and use digital information from the computer;

second gate means comprising a second set of gates, each gate having a first input and a second input and an output, said first inputs of said second set of gates being connectable to a second set of bits of the digital information output channel of the bus connected to the computer and at least some of these bits connected to these additional systems;

first inverter means comprising a first inverter having an input and an output, said input being connectable to one output of a number of mutually exclusive outputs of a decoder/demultiplexer of device selector means that has the data inputs of the decoder/demultiplexer connected to a third set of bits of the digital information output channel of the bus to provide at that output of the decoder/demultiplexer a signal when particular digital information is placed on the third set of bits by the computer to select said system, instead of another system, to use digital information placed on the first and second sets of bits, and said output of said first inverter being connected to said second inputs of said first set of gates and of said second set of gates;



third gate means comprising a third set of gates, each gate having a first input and a second input and an output, said first input being connectable to a different output of a first set of outputs of a manually-operated entry station to provide digital information to said first inputs of said third set of gate means;

fourth gate means comprising a fourth set of gates, each gate having a first input and a second input and an output, said first inputs being connectable to a different output of a second set of outputs of the entry station to provide digital information to said first inputs of said fourth set of gates;

second inverter means comprising a second inverter having an input and an output, said output of said second inverter being connected to said second inputs of said third set of gates and of said fourth set of gates; and decoder/demultiplexer means comprising a decoder-demultiplexer having a number of data inputs, each connected to a different output of the gates of said second set of gates and to a different output of said fourth set of gates to provide at one of its number of mutually exclusive outputs a signal, that output being dependent upon the digital information provided at the data inputs of said decoder/demultiplexer of said decoder/demultiplexer means;

a number of actuator modules, each actuator module including:

storage buffer means having a set of data inputs corresponding in number to the number of outputs of said gates of said first set of gates, a corresponding number of data outputs and a load input, said storage buffer means being constructed to load and retain at said data output signals, corresponding to the data input signals of said storage buffer means, as a result of a signal to said load input of said storage buffer means, and each of said data inputs of said storage buffer means being connected to a different one of said outputs of said first set of gates and also connected to a different one of said outputs of said third set of gates;

gate means including:

a gate having a first input and a second input and an output, said output being connected to said load input of said storage buffer means; and

an inverter having an input and an output, said output being connected to said first input of said gate of said actuator module and said input being connected to one output of said decoder/demultiplexer of said decoder/demultiplexer means, and said input of said inverter of each actuator module being connected to a different output of that decoder/demultiplexer; and

means connected to at least one of said data outputs of said storage buffer means and responsive to the signals at said outputs of said storage buffer means to operate at least one device of the process equipment when there is a change in the signal provided to that device by at least one of said data outputs of said storage buffer means;

means to transmit an execute pulse to said second input of said gate of each actuator module, said means being connectable to another bit of the digital information output channel of the bus, that bit being connected to all other systems that are connected to at least some of the first set of bits and connected to at least some of the second set of bits of the digital information output channel of the bus, said additional bit having placed on it said execute pulse by the computer during the time that the first and second sets of bits have placed on them digital information by the computer; and

switch means to provide a manual pulse when momentarily closed, said switch means being connected to said second input of said gate of each actuator module,

said second inverter means providing a signal at the output of said second inverter to said second inputs of said third and fourth sets of gates to open those gates only when said output of said first inverter does not provide a signal to said second inputs of said first and second sets of gates that opens said first and second sets of gates.

4,005,388

HAND-HELD INTERACTIVE TERMINAL

Richard E. Morley, Greenville, and George G. Schwenk, Nashua, both of N.H., assignors to Termiflex Corporation, Nashua, N.H.

Continuation of Ser. No. 417,827, Nov. 21, 1973, abandoned. This application July 31, 1975, Ser. No. 600,575

Int. Cl.² G06F *3/02, 3/04, 3/14;* G08C *1/00*

U.S. Cl. 340—172.5 **32 Claims**

1. An interactive terminal, for communication with external data processing means, comprising:

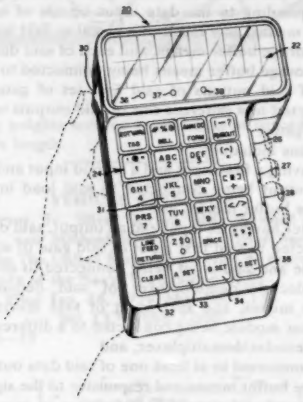
A. an alpha-numeric display for visually presenting data received and transmitted;

B. a data memory communicating with said display for storage of at least a portion of information received and transmitted;

c. an information entry keyboard operable by the user's first hand wherein each of a plurality of said keys represents the transmission of "*n*" different information levels, "*n*" being an integer greater than 1;

d. at least "*n*–*l*" shift level control keys simultaneously operable by the user's second hand for selecting the desired information level for transmission of all "n" information levels;

e. information transmission means communicating with said keyboard and said shift level control keys for transmitting selected keyboardinformation to at least said external data processing means;



f. information receiving means communicating with said external data processing means and said data memory for receipt of information; and

g. housing means dimensioned for the palm of the user's second hand having a front face dimensioned for mounting said keyboard, and at least one side dimensioned for mounting said shift level control keys;

whereby the fingers of the user's second hand select desired shift level control keys and the user's first hand selects desired keys of the information entry keyboard.

4,005,389

ARRANGEMENT FOR REDUCING THE ACCESS TIME IN A STORAGE SYSTEM

Hans-Joerg Penzel, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

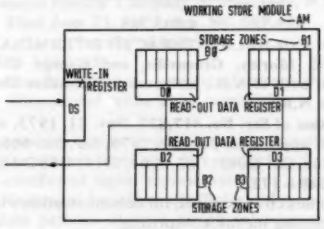
Filed Sept. 17, 1974, Ser. No. 506,839

Claims priority, application Germany, Sept. 21, 1973, 2347632

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² G06F *13/00*

U.S. Cl. 340—172.5 **3 Claims**



1. An arrangement for reducing the access time in a storage system, which system comprises a working store including store modules, by intermediately storing a plurality of items of data read out from the working store, said arrangement comprising:

a plurality of storage zones in each of said store modules which can be read out independently of one another;

a plurality of read-out data registers each assigned to a respective storage zone; and

a common write-in register assigned to all storage zones of a store module.

4,005,390

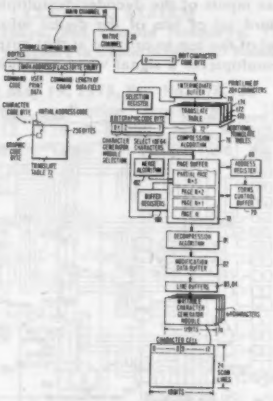
MERGER AND MULTIPLE TRANSLATE TABLES IN A BUFFERED PRINTER

Gerald I. Findley, Morgan Hill, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 11, 1974, Ser. No. 522,994

Int. Cl.² G06F *3/12, 7/32, 13/00*

U.S. Cl. 340—172.5 **19 Claims**



1. An arrangement for printing lines of characters in response to sequentially occurring lines of coded data, each line of coded data including a command, comprising:

data storage means having a plurality of storage locations therein, each storage location being capable of storing a line of coded data;

selecting means for selecting a particular one of the storage locations of the data storage means to receive the sequentially occurring lines of coded data, the selecting means being responsive to the commands of the sequentially occurring lines of coded data to continue to select the previously selected storage location in response to a first type of command and to advance to and select the next storage location in response to a second type of command from the first type;

means responsive to each of the sequentially occurring lines of coded data for merging the line of coded data with any line of coded data already in the storage location selected by the selecting means in accordance with a predetermined algorithm, said means for merging including means for comparing portions of the line of coded data with portions of any line of coded data already in the storage location and means responsive to the means for comparing for recording selected ones of the compared portions in accordance with the results of the comparison; and

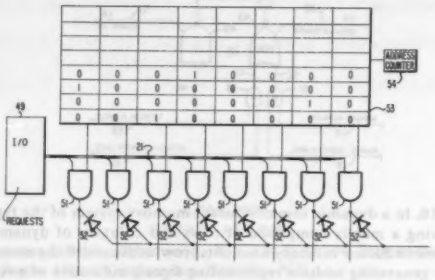
means responsive to the lines of coded data in the storage locations of the data storage means for printing characters represented by the coded data in each line.

4,005,391

PERIPHERAL INTERRUPT PRIORITY RESOLUTION IN A MICRO PROGRAM DATA PROCESSOR HAVING PLURAL LEVELS OF SUBINSTRUCTION SETS

Alastair George MacPherson, Linlithgow, West Lothian, Scotland, assignor to Burroughs Corporation, Detroit, Mich.

Filed June 6, 1975, Ser. No. 584,359
Claims priority, application United Kingdom, Jan. 7, 1975, 512/75
Int. Cl.² G06F 9/18
U.S. Cl. 340—172.5 9 Claims



1. A data processing system having a first memory, a plurality of peripheral devices each having a service request line and a processor, said processor comprising:

a function unit to perform logical operations on data;

a control memory coupled to said function unit and containing control instructions to control data transfers to and from said function unit;

micro instruction fetch means coupled to said first memory to fetch a sequence of micro instructions;

control instruction fetch means coupled to said micro instruction fetch means and to said control memory to fetch individual control instructions in response to the respective micro instructions;

priority resolution means connected to said service request lines, said function unit and said first memory to receive sets of signals from said first memory for comparison by said function unit with all of said service request line signals, each set of signals from said first memory indicating that only one particular peripheral divice is to be serviced; and

signal fetch means coupled to said first memory, said control memory and to said priority resolution means to fetch said sets of signals in a sequence, said sequence representing priority levels of the respective peripheral devices from the highest priority to the lowest priority, said sequence fetching being under control of a control instruction.

4,005,392

METHOD AND APPARATUS FOR DETECTING AND RECORDING ABNORMAL CONDITIONS IN THE OPERATION OF SPINNING MACHINES

Takeaki Akatsuka; Akinori Kato; Teiryo Kojima; Sinji Inaba, all of Otsu, and Kohichi Higashino, Kyoto, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed July 31, 1975, Ser. No. 600,712
Claims priority, application Japan, Aug. 2, 1974, 49-88683; Aug. 2, 1974, 49-88686; Aug. 2, 1974, 49-88687
Int. Cl.² G06F 3/04, 3/14, 11/06
U.S. Cl. 340—172.5 7 Claims

1. A method of controlling spinning machines comprising the steps of:

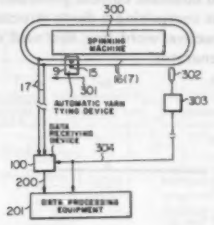
providing at least one rail and transmission lines around a plurality of spinning machines in blocks;

circulating at least one working machine having a detector along said rail for monitoring the running conditions of said spinning machines;

detecting said running conditions of each spinning machine by said detector and transmitting a first information signal having unique characteristic portions indicative of the nature of possible abnormal conditions of each spinning machine in accordance with the detected signals through said transmission lines;

receiving said information signal at a remote central station having data receiving and registering means and a data processor;

generating a second information signal having unique characteristic portions indicative of the nature of abnormal



conditions of spinning machines in accordance with the first signal and registering successively said characteristic portions of said second signal into registers;

reading the contents of registers into said data processor successively during one cycle of monitoring operations only when an interrupt signal, indicating that the occurrence of an abnormal condition, is generated;

tabulating the data thus read in the data processor, and;

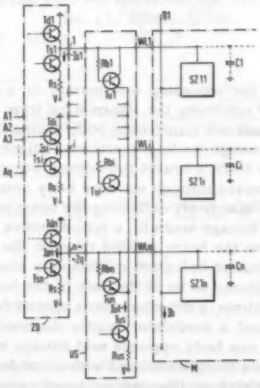
updating the data in a memory in the processor each time said working machine moves once around the spinning machines.

4,005,393

BIPOLAR SEMICONDUCTOR MEMORY WITH RECHARGING CIRCUIT FOR CAPACITIVELY LOADED LINES

Reinhard Schuerba, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed June 4, 1975, Ser. No. 583,690
Claims priority, application Germany, June 26, 1974, 2430784
Int. Cl.² G11B 11/40; G11C 7/00
U.S. Cl. 340—173 FF 2 Claims



1. A bipolar semiconductor memory system comprising:

a word organized memory including a plurality of memory cells arranged in a matrix of columns and rows, a plurality of bit lines each connected to each memory cell of a

respective column, and a plurality of word lines each connected to each memory cell of a respective row, said memory cells constituting a capacitive load connected to said lines;

a decoder for receiving address signals for selecting memory words, said decoder including a plurality of emitter follower output switches each connected to a respective word line; and

a recharging circuit connected to each word line of said memory, said recharging circuit including a common constant current generator for said word lines, and a plurality of coupling circuits each connecting a respective word line to said constant current generator, each of said coupling circuits comprising a diode structure connected between a respective word line and said common constant current generator.

4,005,394
HOLOGRAPHIC STORAGE DEVICE

Horst Kiemle, Neuried, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany, DT

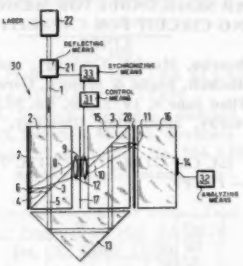
Filed Mar. 20, 1974, Ser. No. 453,067

Claims priority, application Germany, Mar. 29, 1973, 2315776

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² G11C *13/04*

U.S. Cl. 340—173 LM **10 Claims**



1. A device for recording information in a holographic storage and for retrieving the information from the storage, comprising at least one transparent body having flat rectangular surfaces, a storage medium positioned adjacent a flat surface of said one body, a source providing a beam of coherent illumination directed through said one body onto the storage medium, means selectively deflecting the beam onto different portions of the storage medium; a retrodirective mirror positioned to receive the beam passing through the storage medium, an illumination hologram containing a plurality of subholograms positioned to be in the path of the beam from the retrodirective mirror, a detector matrix spaced from the storage medium, and a modulator matrix disposed adjacent a surface of said one body opposite said storage medium, said modulator matrix being associated with a condensing optical system for receiving an illuminating beam reconstructed by the redirected beam impinging on a sub-hologram of the illumination hologram and focusing an object beam created from the illuminating beam by the modulator matrix onto the storage medium to record a hologram thereon.

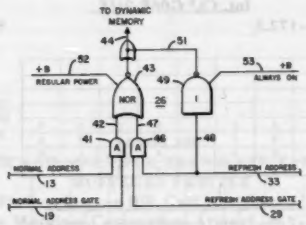
4,005,395
COMPATIBLE STANDBY POWER DRIVER FOR A DYNAMIC SEMICONDUCTOR

Dick E. Fosler, Jr., and Thomas L. Krocheski, both of St. Paul, Minn., assignors to Sperry Rand Corporation, New York, N.Y.

Filed May 8, 1975, Ser. No. 575,541

Int. Cl.² G11C *7/00*

U.S. Cl. 340—173 DR **10 Claims**



10. In a dynamic semiconductor memory system of the type having a matrix comprised of rows and columns of dynamic semiconductor memory elements, row address driving means for generating address representing signals indicative of a row in said matrix, column address driving means for generating address representing signals indicative of a column in said matrix, the improvement comprising X column address driver circuits including

a. a high power driving gate adapted to be connected to a source of normal interruptible power;

b. a low power driving gate adapted to be connected to a source of always-on power;

c. means for logically combining the output terminals of said high power driving gate and said low power driving gate;

d. means for selectively applying normal or refresh address representing signals to the input of said high power driving gate; and

e. means for also connecting said refresh address representing signals to the input of said low power driving gate, whereby an output is produced at the output of said column address driver circuit even in the absence of said normal interruptible power.

4,005,396
DIGITAL DISPLACEMENT SENSOR WITH ZIGZAG COILS

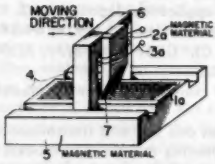
Hideo Fujiwara, Tachikawa; Yukio Ichinose, Kokubunji; Kazuo Ichino, Hamura; Isamu Orita, Kokubunji; Yasutaro Uesaka, Hachioji; Michiyasu Itoh, Kodaira, and Hisashi Thuruoka, Oume, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Nov. 18, 1974, Ser. No. 524,867

Claims priority, application Japan, Nov. 16, 1973, 48-128903; Dec. 24, 1973, 48-143479; Dec. 24, 1973, 48-143480

Int. Cl.² G08C *9/04, 19/28*

U.S. Cl. 340—196 **12 Claims**



1. A digital displacement sensor comprising:

a substantially flat plate made of magnetic material;

a plurality of sensing coils disposed adjacent one another on said plate, each coil having alternate concave and convex portions, the pitches of the alternate concave and convex portions of adjacent sections of each coil differing from those of adjacent coils; and

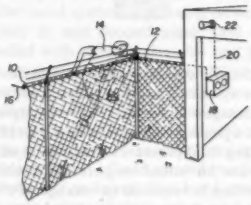
a moving element displaceable in a direction parallel to said sensing coils and including a magnetic head, an edge of which is positioned adjacent to but spaced apart from said coils, and a coil wound around said head which is supplied with a high frequency current.

4,005,397

FENCE ALARM

Raymond Blair, Brentwood, N.Y., assignor to International Fence Alarm Corporation, Sayville, N.Y.

Filed Sept. 2, 1975, Ser. No. 609,413
Int. Cl.² G08B *23/00*
U.S. Cl. 340—223 **4 Claims**



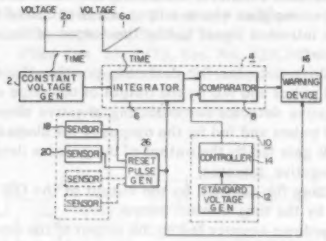
1. An alarm for detecting the surmounting of a fence or other vertical barrier, said alarm comprising plural pulse-emitting switches strategically located in supported relation along said fence so as to cause the transmission of an electrical pulse in response to a vibratory movement of said fence, a stepping switch having circumferentially spaced plural contacts including a starting contact and successively encountered vibration-detecting contacts electrically connected to be operated by said transmitted pulses so as to be urged through movement from said starting contact into contact with said successively encountered vibration-detecting contacts, said stepping switch also having an electrically operated reset coil for being returned to said starting contact from a position at any one successively encountered vibration-detecting contact in response to an electrical pulse transmitted to said reset coil, a timer electrically connected to pulse said reset coil to cause the positioning of said stepping switch at said starting contact at each conclusion of a successive timing interval of operation of said timer, an alarm electrically connected to be selectively operated by said transmitted pulses, and a rotary switch having cooperating contacts in substantial relation therewith as said successively encountered contacts are related to said stepping switch, said rotary switch being electrically connected in circuit-completing interposed position between said stepping switch and said alarm so that said circuit therebetween is completed only when said stepping switch and said rotary switch are each at cooperating corresponding circuit-completing contacts, whereby an imposed condition for operation of said alarm is the completion of said circuit as provided by the selection of a rotary switch contact within said timing interval of said timer, and thus a condition contributing to minimal false alarms.

4,005,398

METHOD OF DETERMINING THE DRIVER'S SUFFICIENT ALERTNESS TO DRIVE A MOTOR VEHICLE SAFELY

Naohiko Inoue; Takayuki Yanagishima, both of Yokohama; Hiromichi Nakamura, Yokohama, and Noburu Fukasawa, Kamakura, all of Japan, assignors to Nissan Motor Co., Ltd., Japan

Filed Mar. 19, 1975, Ser. No. 559,922
Claims priority, application Japan, Apr. 16, 1974, 49-41749
Int. Cl.² G08B *21/00*
U.S. Cl. 340—279 **3 Claims**



1. A method of determining driver's alertness and warning the driver when his alertness falls below a preselected level while driving a vehicle, which comprises the steps of:

generating a first signal having a preselected constant potential;

integrating the first signal with respect to time;

generating a second signal which is a standard potential indicative of a minimum allowable limit of the driver's degree of alertness;

comparing the magnitudes of the integrated first and the second signals;

warning the driver when the magnitude of the integrated first signal exceeds that of the second signal; and

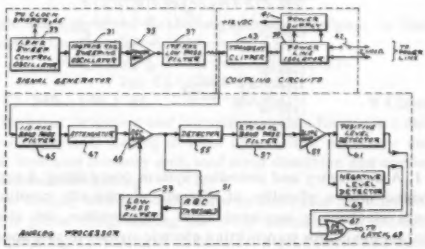
sensing the driver's sufficient alertness for safe driving to reset the integrating and to stop the warning.

4,005,399

IMPEDANCE SENSITIVE POWER LINE INTRUSION ALARM SYSTEM

Vytautas V. Pazemenas, Sunnyvale, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Feb. 14, 1975, Ser. No. 550,091
Int. Cl.² H04M *11/04*
U.S. Cl. 340—310 R **2 Claims**



1. A system for transmitting an alarm through a power line upon detection of an alteration of impedance thereon, comprising:

a. a time control means;

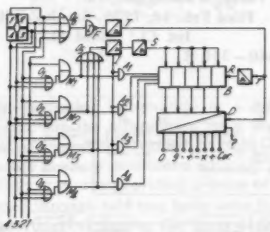
b. a sweeping oscillator fed by the output of the time control means;

c. a power line;
d. means for altering the impedance on the power line upon an intrusion, the impedance altering means being connected to the power line;
e. means for coupling the sweeping oscillator to the power line, including
2. a transient clipper connected to the output of the sweeping oscillator for protecting same, and
2. a power line isolator fed by the output of the transient clipper, the isolator being connected to the power line;
f. an automatic gain control circuit connected to the transient clipper;
g. an envelope detector fed by the output of the automatic gain control circuit for extracting an intrusion signal;
h. a slope amplifier whose output is a function of the slope of the intrusion signal fed by the output of the envelope detector;
i. a positive detector for detecting positive slopes of the signal pulses and fed by the output of the slope amplifier;
j. a negative detector for detecting negative slopes of the signal pulses and fed by the output of the slope amplifier;
k. an OR gate fed by the output of the positive detector and the negative detector;
l. a latching flip-flop fed by the output of the OR gate and reset by the time control means;
m. an up/down counter fed by the output of the time control means for counting pulses therefrom, the direction of the up/down counter being controlled by the latching flip-flop;
n. a decoder circuit fed by the output of the up/down counter for recognizing a predetermined count in the up/down counter; and
o. an alarm system fed by the output of the decoder upon reaching the predetermined count in the up/down counter.

4,005,400
DATA ENTRY AND DECODING SYSTEM FOR SCRIPTED DATA

Jean Engdahl, Bienne, Switzerland, assignor to Societe Suisse pour l'Industrie Horologere Management Services S.A., Bienne, Switzerland

Filed Apr. 22, 1975, Ser. No. 570,453
Claims priority, application United Kingdom, Apr. 30, 1975, 18902/75
Int. Cl.² G08C 1/00
U.S. Cl. 340—365 R **9 Claims**

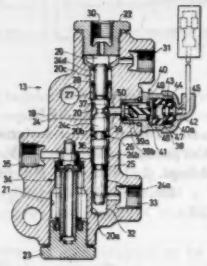


1. A data entry and decoding system comprising: a surface divided into a plurality of discrete electrically conducting zones electrically insulated from one another, an electric contact device for transmitting electric signals to said zones as said electric contact device is moved over said surface in a path forming a data character; logic circuit means connected to said zones for generating a sequence of multi-bit combinations of signals, each multi-bit combination of signals representing a zone contacted by said contact device as said contact device is moved over said surface to form said data character, and the position of each multi-bit combination in said sequence corresponding to the sequence in which said zones are contacted; storing means responsive to said logic circuit means and having means for storing said multi-bit combinations of signals in accordance with the sequence in which they are generated; and decoder means responsive to said storage means for generating a pattern of signals representing said data character.

4,005,401
ELECTRICAL SWITCH FOR A BRAKING FLUID PRESSURE FAULT ALARM DEVICE

Masakazu Ishikawa, Toyota; Takaaki Ota, Okazaki; Noriakira Ishigami, Chiryu, and Asao Kozakai, Anjyo, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed May 21, 1975, Ser. No. 579,689
Claims priority, application Japan, May 22, 1974, 49-59071
Int. Cl.² B60T 17/22; H01H 35/38
U.S. Cl. 340—52 C **9 Claims**



1. In a braking fluid pressure fault alarm device for a vehicular dual brake system, including a fluid control body having a cylindrical passageway defined therein, a piston slidably inserted in said cylinder and receiving a plurality of oppositely exerting braking fluid pressures, said piston adapted for sliding movement from an initial inoperative position to a second operative position in response to leakage of one of the braking fluid pressures, and an electric alarm circuit having alarm signal means for generating an alarm signal when said electric alarm circuit is deenergized, the improvement comprising:
an electric switch in engagement with said piston for being switched from a normal conductive condition to an actuated nonconductive condition in response to the sliding movement of said piston for deenergizing said electric alarm circuit, said electric switch including a switch body screwed into said fluid control body and being in electrical contact therewith, said switch body being formed with a stepped through bore having larger and smaller diameter portions; an annular plate-like support fixedly mounted in the larger diameter portion of said switch body and being in electrical contact therewith; an electrically insulating terminal holder fixedly mounted in the larger diameter portion of said switch body and having a recess facing said support; an electrically conductive plate disposed in the recess of said terminal holder; a terminal fixedly mounted in a central portion of said terminal holder, a first spring disposed in the recess of said terminal holder for biasing said plate into abutting engagement with said support and for providing electrical contact between said terminal and said plate, said first spring being weak; a plunger inserted in the smaller diameter portion of said switch body and having an electrically insulating end portion; and a second spring interposed between said plunger and said support and in a state of compression; said second spring being loaded at a preset level so as to bias said plunger in the direction away from said plate, whereby said plunger can be moved, in response to the sliding movement of said piston from an inoperative position to an operative position, toward said plate to bring its end portion into abutting engagement

with said plate to thereby separate said plate from said support.

4,005,402

FLAT PANEL DISPLAY APPARATUS

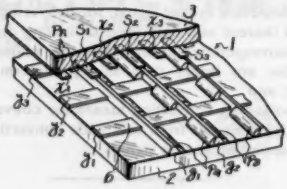
Yoshifumi Amano, Zushi, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Apr. 9, 1975, Ser. No. 566,258

Claims priority, application Japan, Apr. 16, 1974, 49-42955

Int. Cl.² H01J 17/48

U.S. Cl. 340—324 M **12 Claims**



1. A flat panel display apparatus comprising: a first insulator plate, a second insulator plate, a plurality of first parallel electrodes attached to said first plate, a plurality of parallel barrier ribs mounted on said first plate over said plurality of first electrodes, said barrier ribs intersecting said first electrodes and projecting toward said second plate to define a plurality of parallel band spaces, a plurality of second parallel electrodes attached to said second plate, said second electrodes being parallel with said barrier ribs and positioned in said band spaces respectively, at least two different phosphors emitting different color lights, a first of said at least two different phosphors being mounted in a first position of a first band space, a second of said at least two different phosphors being mounted in a second position of a second band space which is different than a first position of said second band space corresponding to the first position in said first band space, the edges of said first and second plates being sealed, and a gas capable of glowing when charged between said first and second plates.

4,005,403

INFORMATION STORAGE AND FREQUENCY CONVERTER FOR LIQUID CRYSTAL DISPLAY

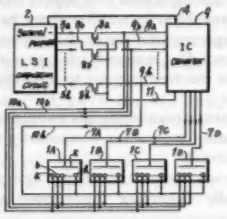
Isamu Washizuka, Kyoto, and Hirohide Nakagawa, Sakurai, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Feb. 28, 1975, Ser. No. 553,933

Claims priority, application Japan, Mar. 1, 1974, 49-24352

Int. Cl.² G09F 9/32

U.S. Cl. 340—336 **7 Claims**



1. A liquid crystal drive network including a source of indication information, and a liquid crystal display unit having a common electrode and segment electrodes, the improvement comprising:

a converter for temporarily storing the indication information;

an input wire including a switching means for introducing the indication information to the converter; and

a wiring means for applying the stored information within the converter to the segment electrodes with the use of the input wires to the converter;

said wiring means including second switching means precluding application of stored information to said segment electrodes during introduction to said converter.

4,005,404

CIRCUIT FOR CONTROLLING A DISPLAY DEVICE

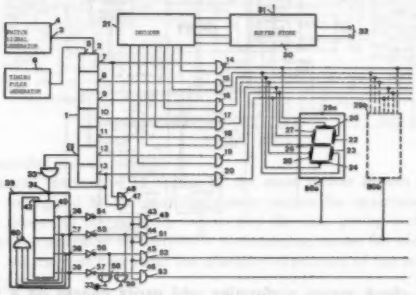
Lembit Soobik, Kranzberg, Germany, assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 23, 1975, Ser. No. 625,357

Claims priority, application Germany, Oct. 29, 1974, 2451237

Int. Cl.² G09F 9/32

U.S. Cl. 340—336 **9 Claims**



1. Control circuit for a display device comprising a plurality of display segments selectively actuable to display desired characters, including segment actuation circuit means for producing output signals according to a character to be displayed, first control circuit means for producing in sequential time overlapping relation, a plurality of equal duration control signals equal in number to said plurality of segments, and means operably responsive to said control signals to supply said output signals to selectively actuate said segments in sequence to cause a display by said display device having the appearance of a complete character.

4,005,405

ERROR DETECTION AND CORRECTION IN DATA PROCESSING SYSTEMS

Joseph Thomas West, Boxborough, Mass., assignor to Data General Corporation, Southboro, Mass.

Filed May 7, 1975, Ser. No. 575,357

Int. Cl.² G06F 11/10

U.S. Cl. 340—146.1 AL **9 Claims**

1. An error detection and correction system for use in a data processing system having at least one central processor unit and at least one memory unit, said error detection and correction system comprising

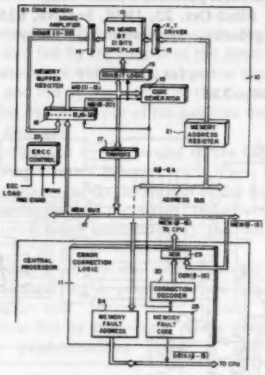
error coding means associated with each said memory unit for performing, during the write portion of a memory operating cycle, parity checks on a predetermined number of different, selected combinations of bits in each data word of said data processing system, each combination having the same total number of bits, said error coding means comprising

parity check means for providing a plurality of parity check bits, said parity check means performing odd parity checks on a first group of said predetermined number of selected combinations and even parity checks on a sec-

ond group of said predetermined number of selected combinations, each parity check bit being associated with one of said selected combinations;

means for forming an extended data word comprising the data bits of said data word and said parity check bits and for storing said extended data word in said memory unit;

said parity check means further performing, during the read portion of said memory operating cycle, parity checks on the same said predetermined number of selected combinations of bits of said extended data word, each said selected combination comprising the same selected combination of data bits as selected during said write portion and the parity check bit associated therewith, said parity



check means performing odd parity checks on a first group of said predetermined number of selected combinations and even parity checks on a second group of said predetermined number of selected combinations, said odd and even parity checks thereby providing a plurality of error bits;

decoding means associated with said central processor unit responsive to said plurality of error bits for producing correction bits which identify the presence and location of a single bit error in said data word; and

means connected to said decoding means and responsive to the correction bits from said decoding means for correcting said single bit error in said data word.

4,005,406

DIGITAL-ANALOG CONVERTER

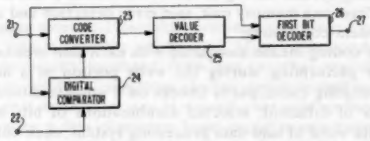
Haruo Kaneko; Yoshio Katagiri, and Kaoru Yano, all of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan

Filed July 15, 1974, Ser. No. 488,859

Claims priority, application Japan, July 14, 1973, 48-79420

Int. Cl.² H03K *13/02*

U.S. Cl. 340—347 DA **8 Claims**



1. A digital-analog converter serving to improve quality in terms of noise by suppressing low level indicating digital input signals corresponding to analog amplitudes below a predetermined absolute value below which said low level indicating digital input signals are assumed to be uncertain but providing conversion of high level indicating digital input signals corresponding to analog amplitudes greater than said predetermined absolute value, said converter comprising:

means for detecting said low level indicating digital input signals corresponding to analog signals whose absolute amplitudes are smaller than said predetermined absolute value and for delivering a detection output signal upon detection of such low level indicating digital input signals, said predetermined absolute value being different from zero;

code converting means for converting said low level indicating digital input signals to a zero code signal when said detection output signal is delivered and, in the absence of said detection output signal, for delivering as the output signal thereof said high level indicating digital input signals corresponding to analog signals whose absolute amplitudes are larger than said predetermined absolute value; and

digital-to-analog converting means for converting the output digital signals from said code converting means into corresponding analog signals.

4,005,407

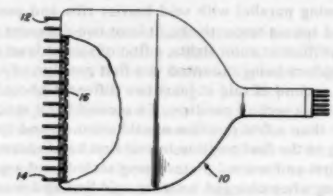
CATHODE RAY TUBE DIGITIZER

John D. Parks, Lorton, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 8, 1975, Ser. No. 575,855

Int. Cl.² H03K *13/18*

U.S. Cl. 340—347 AD **7 Claims**



1. A CRT for digitizing a single valued function analog plot comprising:

a plurality of conductor means disposed along a single line across the inner surface of the tube face, against which an electron beam, inside the tube, impinges;

a corresponding number of electrodes protruding through the face of the tube, each electrode connected at an inward end thereof to respective conductor means, the electrodes individually transmitting digitized electrical signals to the exterior of the tube, when respective conductor means are impinged;

an encoding means connected to the outward ends of the electrodes which reduces the binary state of the electrodes by gating means to a digital output having binary bit positions fewer in number than the electrodes;

a first storage register connected between the electrodes and the encoding means for temporarily storing the outputs of the electrodes, prior to unloading to the encoding means;

a second storage register means connected to the output of the encoding means for temporarily storing the digital output thereof;

a clock means connected to the first storage means for sequentially unloading the register at a selected frequency;

a clock means connected to the second storage means for sequentially unloading the register at a frequency that is the same as the clock frequency of the first storage register; and

a means connecting the output of the second storage regis-

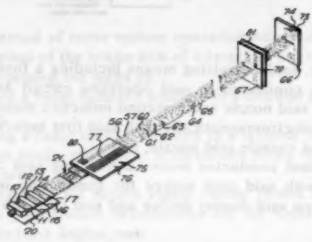
ter to a computer for comparing three consecutive outputs from the second storage register to a look-up table in a digital computer which determines the corresponding point on the plot;

wherefore, the digitized electrical signals relate to points along the analog plot.

4,005,408
MULTIPLE ELECTRON BEAM ANALOG TO DIGITAL CONVERTER

George W. Taylor, Brielle, and Mortimer H. Zinn, Elberon, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 8, 1975, Ser. No. 620,686
Int. Cl.² H03K *13/02*
U.S. Cl. 340—347 P 7 Claims



1. An electron beam analog signal to digitally coded electrical signal conversion device, comprising; a cathode for generating a sheet beam of electrons, a traveling wave electron beam deflection system spaced from said cathode and in alignment with said electron sheet beam for dividing said electron sheet beam into a plurality of separate electron beams and for selectively aligning said separate electron beams with the analog to digital signal conversion device, a traveling wave analog deflection system spaced from said time deflection system and in alignment with said separate electron beams for sweeping said beams through angles that are related to the analog signal, a target plate having a plurality of apertures formed therein, said apertures being aligned in columns, each of said columns being individual to a respective one of said separate electron beams, said columns and apertures corresponding to the digital code, and an electron beam semiconductor target array spaced from said target plate and in alignment with said target plate apertures to permit said target plate apertures to enable said separate electron beams to selectively pass through at least some of said target plate apertures in response to the analog signal and to impact on at least some of said electron beam semiconductors in said target array to produce a digital signal that corresponds to the analog signal.

4,005,409
MULTIPLE MODE INPUT ANALOG CONTROLLER HAVING STANDBY POWER SUPPLY AND ABSENCE-OF-INPUT SENSING

Mervyn L. Feuer, Los Angeles, Calif., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Mar. 10, 1975, Ser. No. 556,999
Int. Cl.² H03K *13/02*
U.S. Cl. 340—347 C 5 Claims

1. A controller circuit comprising

a memory having an input and a plurality of outputs for generating digital signals;

digital-to-analog converting means responsive to the digital signals from the memory for converting the digital signals to an analog signal;

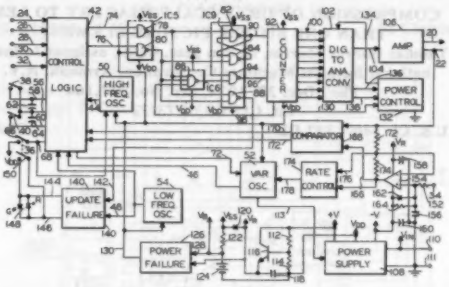
first digital input means responsive to digital input signals for incrementally changing the digital signals in the memory;

second digital input means responsive to digital input signals and including a first oscillator for changing the digital signals in the memory in proportion to the length of the digital input signal;

analog input means including a second oscillator generating a digital signal for changing the digital signals in the memory;

data gating means for selectively connecting one of the first digital input means, the second digital input means and the analog input means to the memory;

main power supply means for the memory, the digital-to-analog converting means, the data gating means, and the input means;



standby power means;

means responsive to failure of the main power means and energized by the standby power means for maintaining power to the memory means and the data gating means;

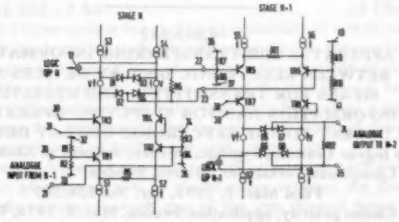
means operated by the power maintaining means for blocking current flow from the plurality of outputs of the memory; and

means operated by the power maintaining means for disabling input to the memory during failure of the main power supply means by inhibiting the operation of the data gating means, the input disabling means also disabling the first and second oscillators to minimize power drain on the standby power means.

4,005,410
ANALOGUE-TO-DIGITAL-CONVERTERS

Peter Colin Michael, Newbury, and Paul Roderick Noel Kellar, Abingdon, both of England, assignors to Micro Consultants Limited, Surrey, England

Filed June 12, 1975, Ser. No. 586,445
Claims priority, application United Kingdom, June 15, 1974, 26613/74
Int. Cl.² H03K *13/02*
U.S. Cl. 340—347 AD 9 Claims



1. In an analogue-to-digital converter including a plurality of stages in series, each stage including a full wave rectifier having rectifier arms and having two inputs and two outputs, each of said inputs receiving an analogue signal together with a constant current such that the full wave rectifier current

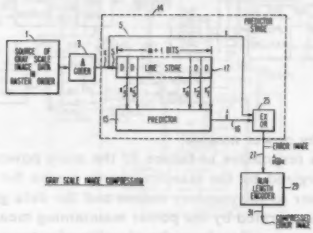
reverses direction when said analogue signal reaches a predetermined level as determined by said input constant current, the provision of temperature compensation means comprising voltage generators connected in series between the arms of said full wave rectifier to provide a voltage bias thereto of such magnitude and polarity that said level of reversal of the rectifier current will remain constant over a wide range of ambient temperatures, said voltage generators having a temperature coefficient of voltage corresponding in magnitude and acting in the same sense as the bridge rectifier arms to which they are connected, thereby to provide a stage bandwidth substantially constant with temperature.

4,005,411

COMPRESSION OF GRAY SCALE IMAGERY TO LESS THAN ONE BIT PER PICTURE ELEMENT

Thomas Harvey Morrin, II, San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 30, 1974, Ser. No. 537,164
Int. Cl.² H03K *13/22*
U.S. Cl. 340—347 DD **6 Claims**



1. An apparatus for compressing an $m \times n$ array of delta coded points, the location of each point being defined as an ordered pair (i,j) for $1 \leq i \leq m$ and $1 \leq j \leq n$, comprising:

means (1,3) for generating delta coded values x of the array in row major order;

an exhaustive non-linear predictor stage (14) comprising a predictor (15–17) and a correlator (25), said predictor (15–17) being responsive to the delta coded values $\hat{x}$ from the generating means for predicting a value x at the array location (i,j) based upon previous values x_1,x_2,x_3 at corresponding locations $(i-1,j-1)$, $(i-1,j)$,$(i,j-1)$ according to the relation:

$$X = x_3x_2+x_3x_1+x_1x_2;$$

the correlator generating a value y correlating the acutal x and predicted values $\hat{x}$ according to the relation $y=x\hat{x}$; and

means (29) for variable length encoding runs of like consecutive values of y from the correlator.

4,005,412

APPARATUS FOR TRANSFERRING INFORMATION BETWEEN ELECTRONIC DISPLAY DEVICES AND MEANS FOR TRANSMITTING AND RECEIVING INFORMATION AND FOR SUPPLYING OPERATING CURRENT TO THE ELECTRONIC DISPLAY DEVICES

Bo Ingvar Leander, Tygelsjo, Sweden, assignor to Aktiebolaget Ljungmans Verkstader, Malmo, Sweden

Filed Mar. 7, 1975, Ser. No. 556,507
Claims priority, application Sweden, Mar. 8, 1974, 7403110
Int. Cl.² G09F *9/32*
U.S. Cl. 340—380 **5 Claims**

1. A system for displaying information transferred between a fuel dispensing nozzle and a remotely located information receiving and transmitting data source comprising

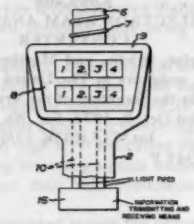
a nozzle operative for the dispensing of fuel.

a data source located at a site remote from said nozzle,

an information display device on said nozzle for displaying information data pertaining to fuel being dispensed,

a battery energized operating circuit located inside said nozzle for supplying operating current to said display device.

energizing means operative only when said nozzle is inoperative for transferring electrical energy to said operating



circuit, said energizing means including a first inductive means connected to said operating circuit and located inside said nozzle and a second inductive means for coupling electromagnetically with said first inductive means located outside said nozzle, and

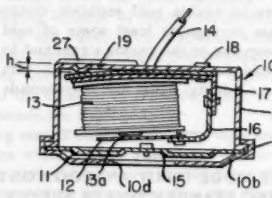
information conductor means connecting said display device with said data source for conducting information between said display device and said data source.

4,005,413

BUZZER CONSTRUCTION AND METHOD OF ADJUSTING THE SAME

Charles Berns, New Milford, Conn., assignor to General Signal Corporation, Rochester, N.Y.

Division of Ser. No. 431,802, Jan. 8, 1974, Pat. No. 3,864,823.
This application Feb. 11, 1975, Ser. No. 549,111
Int. Cl.² G01K *1/08*; G08B *3/00*
U.S. Cl. 340—402 **6 Claims**



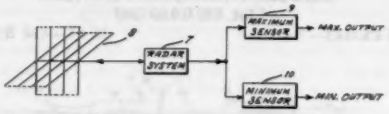
1. A buzzer assembly comprising a housing, an electrically energizable coil unit mounted within said housing with one side of said coil unit being adjacent an interior wall of said housing, and diaphragm means within said housing mounted for vibratory motion adjacent said coil unit on the side of said unit remote from said interior wall, a deformed portion of said interior wall being bent away from the adjacent portion of said interior wall to protrude inwardly of said interior wall into engagement with said coil unit, said deformed portion thereby defining the spacing between said one side of said coil unit and said interior wall of said housing to define in turn the dimensions of the gap between the other side of said coil unit and said diaphragm means.

4,005,414

METHOD FOR PROVIDING MEANS TO ELIMINATE AMBIGUOUS POLARIZATION EFFECTS ON PHASE AND AMPLITUDE OF RADAR BACKSCATTER DUE TO UNKNOWN TARGET ASPECT ANGLE

William B. Goggins, Jr., Locke Mills, Maine, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed June 24, 1975, Ser. No. 589,805
Int. Cl.² G01S 9/00
U.S. Cl. 343—5 SA **2 Claims**



1. A method of radar system operation adapted to provide determination of the major axis of a target of unknown aspect angle comprising the steps of

operating a radar transmit antenna in a circular polarization mode,

operating a radar receive antenna in a variable linear polarization mode, said linear polarization being varied over a 180° range,

acquiring data for return signal values versus receive antenna polarization orientations for all receive antenna polarization angles, and

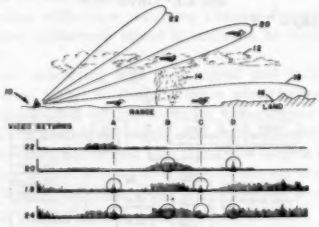
determining the target major axis as being coincident with the receive antenna polarization angle corresponding to the maximum return signal value and orthogonal to the receive antenna polarization angle corresponding to the minimum return signal value.

4,005,415

AUTOMATED RADAR DATA PROCESSING SYSTEM

Alexander Kossiakoff, Brookville, and James R. Austin, Gaithersburg, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 31, 1975, Ser. No. 563,908
Int. Cl.² G01S 9/02
U.S. Cl. 343—5 VQ **20 Claims**



1. An automatic system for processing data from a radar system in accordance with the radar video returns, radar coordinate signals and radar trigger pulses produced within radar system comprising, in combination,

video processor circuit means for processing said radar video returns for overlapping radar beam groups to produce processed video output signals indicating when the radar video returns in each beam group exceed a threshold level indicating the presence of a radar target,

said video processor circuit means including threshold level generating circuit means for causing said threshold level to vary in accordance with the magnitude of radar video returns in a plurality of radar resolution cells adjacent a resolution cell of interest in both range and elevation, whereby said threshold level is adaptive to the radar environment of said cell of interest, and

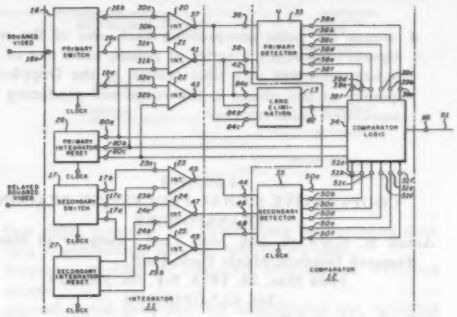
programmed computer means responsive to said processed video output signals, said radar coordinate signals and said radar trigger pulses for storing and updating continuously data defining target tracks.

4,005,416

APPARATUS FOR PROCESSING RADAR VIDEO SIGNALS

Terry Allen Tucker, Charlottesville, and Jeffrey Clarus Rice, McLean, both of Va., assignors to Sperry Rand Corporation, New York, N.Y.

Filed June 18, 1975, Ser. No. 587,940
Int. Cl.² G01S 9/02
U.S. Cl. 343—5 VQ **14 Claims**



1. A radar video processor comprising:

input means for receiving sets of primary sequential signals of a predetermined time duration;

primary integrating means, coupled to said input means, for integrating each of said primary signals over said predetermined time duration, thereby providing an integrated value for each of said primary signals; and

comparator means, coupled to said primary integrating means, for comparing said integrated value of one of said primary sequential signals with said integrated values of primary signals preceding and succeeding said one, and for providing a target indication whenever said comparison of said integrated value of said one to said integrated values of said preceding and succeeding primary signals each exhibit a ratio greater than a predetermined value.

4,005,417

FREQUENCY SPECTRUM ANALYZER

John D. Collins, Burlington, Mass., assignor to Raytheon Company, Lexington, Mass.

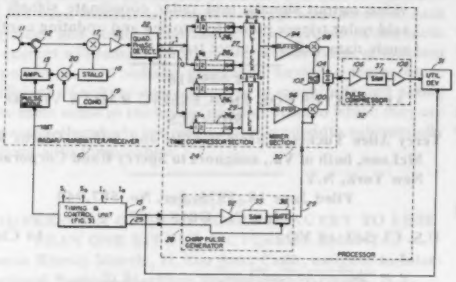
Filed Aug. 14, 1975, Ser. No. 604,692
Int. Cl.² G01S 9/02
U.S. Cl. 343—5 SA **10 Claims**

1. In a radar system for producing a plurality of sets of radar returns, each one of such sets corresponding to radar returns from objects disposed in each one of a like plurality of range cells, the radar returns in each one of the sets thereof being stored at the radar system pulse repetition frequency, a signal processor for determining the Doppler frequency of the objects in each one of such range cells, comprising:

a. time compressor means for serially retrieving each one of the plurality of sets of stored radar returns, the stored radar returns in each one of the sets thereof being retrieved at a rate greater than the radar system pulse repetition frequency and being retrieved in a time duration K τ to produce a series of time compressed signals;

b. means, operative synchronously with the time compressor means, for serially producing a like plurality of chirp pulses, each one of such pulses having a dispersive time K τ and a dispersive bandwidth Kβ;

c. means for mixing each one of the time compressed signals with a corresponding one of the chirp pulses to produce a series of mixed signals; and,



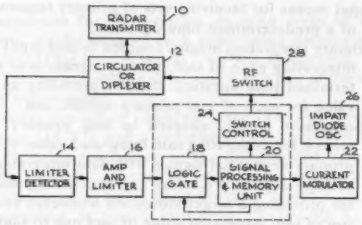
d. means for pulse compressing each one of the mixed signals to produce a series of pulses, each one of such pulses occurring at a time related to the Doppler frequency of any object in the range cell producing such associated radar returns.

4,005,418

COOPERATIVE SIGNAL PROCESSING BEACON TRANSPONDER

Ashok K. Gorwara, San Jose, Calif., assignor to Stanford Research Institute, Menlo Park, Calif.

Filed Mar. 28, 1975, Ser. No. 562,829
Int. Cl.² G01S 9/56
U.S. Cl. 343—6.8 R **3 Claims**



1. In a radar system of the type having a transmitter for transmitting a train of pulse signals and a receiver for receiving said train of pulse signals reflected from a target, a target signal enhancement circuit comprising

inoperative oscillator means for generating, when operative, a train of pulse signals having the same frequency and duration as is transmitted by said transmitter, said inoperative oscillator means requiring a first interval for reaching its steady state condition after being rendered operative,

inoperative switch means for applying the output of said oscillator means to said transmitter for transmission when operative,

first means responsive to said receiver receiving said train of pulse signals reflected from a target for generating a first pulse having a width equal to said first interval plus a second interval equal to the time required for generating said train of pulse signals,

second means responsive to said receiver receiving said train of pulse signals reflected from a target for generating a second pulse which is delayed for said first interval and which has a width equal to said second interval,

means for respectively applying said first pulse and said second pulse to said respective inoperative oscillator means and said inoperative switch means whereby said signals reflected from said target are enhanced, and

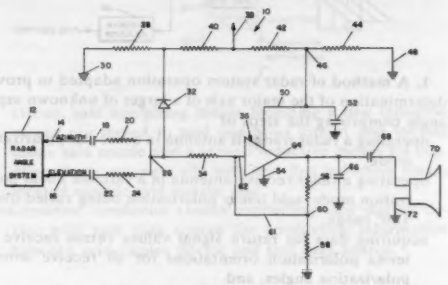
means for preventing said first and second means responsive to said receiver receiving said train of pulse signals, from responding to another received train of pulse signals while operating in response to an already received train of pulse signals.

4,005,419

BEACON SIDE LOBE DETECTOR

Clinton L. Wilcox, Sun Spot, N. Mex., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 19, 1976, Ser. No. 649,952
Int. Cl. G01s 7/02
U.S. Cl. 343—7.4 **5 Claims**



1. An error detection system for tracking radar comprising:

a radar angle system having outputs for azimuth and elevation error signals;

an audio amplifier;

isolation means connected between the angle system outputs and an input of the audio amplifier; and

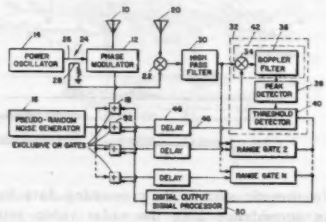
a speaker connected to an output of the audio amplifier for producing different audible tones in response to different azimuth and elevation error signals.

4,005,420

CW RADAR SYSTEM

Thomas Wayne McDonald, Dana Point, Calif., assignor to Esterline Electronics Corporation, Costa Mesa, Calif.

Filed Mar. 12, 1975, Ser. No. 557,479
Int. Cl.² G01S 9/39
U.S. Cl. 343—7.5 **9 Claims**



1. The method of measuring distance to a first object which is moving relative to a second object, which includes the steps of:

transmitting a radar signal from the second object toward the first object, the radar signal comprising a continuous carrier phase modulated by a repetitive digital code;

simultaneously receiving echoes of said radar signal returning to said second object from said first object;

multiplying said echo by a delayed sample of said digital

code to device a signal corresponding to their product which includes a Doppler component; and

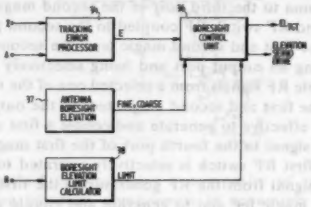
developing and transmitting a telemetry signal by modulating said carrier as a function of the amplitude of said Doppler component.

4,005,421

MONOPULSE RADAR SYSTEM AND METHOD FOR IMPROVED LOW ELEVATION TRACKING

Peter R. Dax, Severna Park, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 30, 1973, Ser. No. 365,245
Int. Cl.² G01S 9/22
U.S. Cl. 343—16 M **12 Claims**



1. In a monopulse tracking radar system, apparatus for tracking low elevation targets comprising:

antenna means for receiving wave energy reflected from a target, said antenna means having a predetermined boresight;

means for generating an elevation tracking error signal related to an angular difference in elevation between a line-of-sight to the target and the antenna means boresight in response to the received wave energy;

means for driving said antenna means in a direction tending to minimize said elevation tracking error signal; and,

means for disabling said driving means in response to approximate coincidence between actual antenna means boresight elevation angle and a predetermined lower limit of antenna means boresight elevation angle, wherein said antenna means includes:

a sum receiving channel for providing a sum signal in response to received wave energy;

an elevation difference receiving channel for providing an elevation difference signal in response to received wave energy;

means for modifying said sum signal and said elevation difference signal so that, with the antenna means boresight positioned in approximate coincidence with said predetermined lower limit, the ratio of said elevation difference signal to said sum signal for targets below said antenna means boresight is approximately the same for wave energy received along a direct path and for wave energy received along a reflected path.

4,005,422

RADAR WITH SAMPLING GATE CIRCUIT FOR VIDEO SIGNAL

Hiroshi Noda, and Yukiyasu Watanabe, both of Kyoto, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 12, 1975, Ser. No. 549,490
Claims priority, application Japan, Mar. 2, 1974, 49-24947
Int. Cl.² G01S 7/28
U.S. Cl. 343—17.1 R **4 Claims**

1. A radar comprising:

an antenna for transmitting and receiving waves;

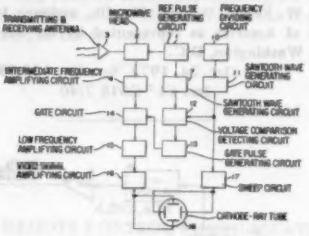
a transmitting and receiving device for transmitting a signal from the antenna corresponding to reference pulses of a reference pulse generator and receiving with the antenna the reflected signal from a target to generate an intermediate frequency signal;

a gate pulse generator under the control of the reference pulses for generating gate pulses which determine the sampling position of the intermediate frequency signal;

a sampling gate circuit for detecting a video signal by sampling the intermediate frequency signal from the transmitting and receiving device in accordance with the gate pulses;

a display for displaying the video signal;

the gate pulse generator comprising



a first signal generator for determining the sampling position in accordance with the reference pulses;

a frequency divider for frequency-dividing the reference pulses;

a second signal generator for determining the sampling position in accordance with the output of the frequency divider;

a comparator for determining the sampling position by comparing the outputs of the first and second signal generators; and

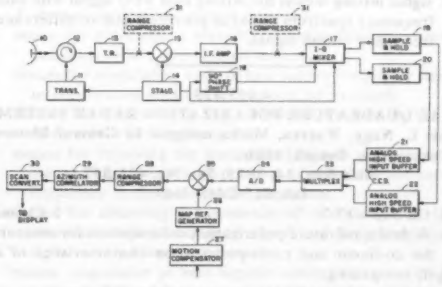
a gate pulse generating circuit for generating gate pulses in accordance with the output signal of the comparator.

4,005,423

SYNTHETIC APERTURE RADAR UTILIZING A LOW-SPEED ANALOG-TO-DIGITAL CONVERTER

William R. Webb, Catonsville, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 9, 1975, Ser. No. 594,415
Int. Cl.² G01S 7/28
U.S. Cl. 343—17.2 PC **4 Claims**



3. In a radar system of the type where detected echo signals are converted into video signal samples that are stored during part of the time interval between the transmission of successive search pulses by said radar system and thereafter converted into corresponding digital signals by an analog-to-digital converter for subsequent processing in the radar system, the improvement of

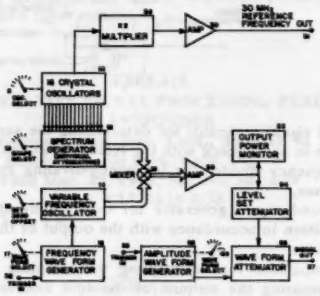
utilizing as the storage means for the video signal samples a high-speed input buffer in the form of a charge-coupled register that accepts these samples at a comparatively high data rate during a first portion of the above time interval and transfers these samples to the analog-to-digital converter at a lower data rate during the remaining portion of this time interval, whereby the analog-to-digital converter can operate at a comparatively low speed while the radar system can still achieve a high degree of range resolution.

4,005,424

SIMULATOR FOR DOPPLER RADAR RETURNS FROM PRECIPITATION

Richard W. Fetter, Warrenville, Ill., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 24, 1975, Ser. No. 625,392
Int. Cl.² G01S 7/40
U.S. Cl. 343—17.7 **9 Claims**



1. A device for simulating Doppler radar returns comprising:

a. means for generating a plurality of signals, each being of an individual frequency and each having an individual amplitude, said plurality of signals having a selected mean frequency;

b. means coupled to said means for generating a plurality of signals for selectively attenuating either any one of said plurality of signals or all of such signals and for summing said plurality of signals to provide a desired frequency spectrum signal;

c. variable frequency oscillator (VFO) means for generating a VFO signal whose frequency can be controllably varied;

d. signal mixing means for mixing said VFO signal with said frequency spectrum signal to provide a sum or difference frequency output signal.

4,005,425

DUAL QUADRATURE POLARIZATION RADAR SYSTEM

Louis L. Nagy, Warren, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 14, 1975, Ser. No. 631,852
Int. Cl.² G01S 7/40
U.S. Cl. 343—17.7 **2 Claims**

1. A dual quadrature polarization radar system for measuring the co-linear and cross-polarization characteristics of a target, comprising:

an RF generator effective to generate an RF signal;

first and second magic tees, each magic tee having first, second, third and fourth ports and being effective to couple equal portions of RF inputs to the first and third ports to the second and fourth ports and couple equal portions of RF inputs to the second and fourth ports to the first and third ports;

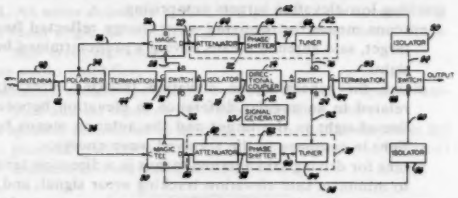
a first RF switch RF coupled to the RF generator and the first port of each of the first and second magic tees, the first RF switch being selectively operable to couple the RF signal generated by the RF generator to a selected one of the first ports of the first and second magic tees;

an RF antenna effective to transmit RF signals toward a target and receive reflected RF signals from the target;

an RF signal polarizer including a first portion RF coupled between the third port of the first magic tee and the RF antenna and effective to vertically polarize and couple RF signals from the third port of the first magic tee to the RF antenna and couple vertically polarized RF signals from the RF antenna to the third port of the first magic tee and a second portion RF coupled between the third port of the second magic tee and the RF antenna and effective to horizontally polarize and couple RF signals from the third port of the second magic tee to the RF antenna and couple horizontally polarized RF signals from the RF antenna to the third port of the second magic tee;

a second RF switch RF coupled to the second port of each of the first and second magic tees, the second RF switch having an output port and being selectively operable to couple RF signals from a selected one of the second ports of the first and second magic tees to the output port;

means effective to generate and couple a first co-linear RF null signal to the fourth port of the first magic tee when the first RF switch is selectively operated to couple the RF signal from the RF generator to the first port of the first magic tee and to generate and couple a first cross-polarized RF null signal to the fouth port of the first magic tee when the first RF switch is selectively operated to couple the RF signal from the RF generator to the first



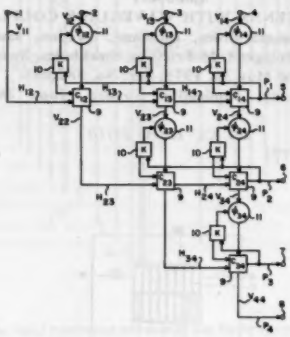
port of the second magic tee, the first co-linear RF null signal being effective to cancel residual RF reflections when the first RF switch is selectively operated to couple the RF signal from the RF generator to the first magic tee and the first cross-polarized RF null signal being effective to cancel residual RF reflections when the first RF switch is selectively operated to couple the RF signal from the RF generator to the second magic tee; and

means effective to generate and couple a second co-linear RF null signal to the fourth port of the second magic tee when the first RF switch is selectively operated to couple the RF signal from the RF generator to the first port of the second magic tee and to generate and couple a second cross-polarized RF null signal to the fourth port of the first magic tee when the first RF switch is operated to selectively couple the RF signal from the RF generator to the first port of the second magic tee, the second co-linear RF null signal being effective to cancel residual RF reflections when the first RF switch is selectively operated to couple the RF signal from the RF generator to the second magic tee and the second cross-polarized RF null signal being effective to cancel residual RF reflections when the first RF switch is selectively operated to couple the RF signal from the RF generator to the second magic tee, whereby selective operation of the first and second RF switches provides an RF output from the output port of the second RF switch which selectively provides a measurement of the co-linear and cross-polarization characteristics of the target wherein the RF signal at the output of the second RF switch is free from residual RF reflections in the radar system for each of the vertical, horizontal and cross-polarization measurements.

4,005,426
SIGNAL PROCESSING METHOD AND APPARATUS

Warren D. White, Northport, N.Y., assignor to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed Sept. 10, 1975, Ser. No. 612,101
Int. Cl.² H04B 7/00
U.S. Cl. 343—100 LE 15 Claims



1. The method of processing a composite of raw input signals having common components in separately variable proportions to produce an output wherein one of said components predominates, and at least one other output wherein said one component does not predominate, comprising the steps of:

a. diverting portions of all said raw inputs and passing the remainders thereof,

b. combining said diverted portions to produce a first output,

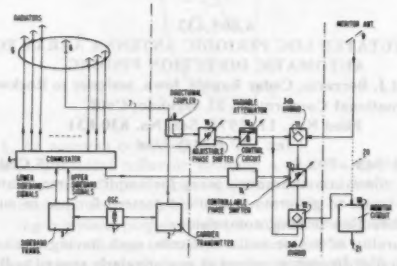
c. adjusting the phases of said raw inputs to maximize said first output, and

d. combining said remainders of said raw inputs to produce at least one further output.

4,005,427
FACILITY FOR MONITORING THE CARRIER-FREQUENCY AND SIDEBAND SIGNALS RADIATED BY A DVOR GROUND STATION

Günter Höfgen, Kornwestheim, Germany, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Feb. 11, 1976, Ser. No. 657,172
Claims priority, application Germany, Feb. 12, 1975, 2505723
Int. Cl.² G01S 1/44
U.S. Cl. 343—106 D 9 Claims



1. In a DVOR ground station system which includes a plurality of first radiators in a generally circular arrangement, commutating means for exciting said radiators according to a predetermined sequence from a sideband transmitter, a second radiator located substantially at the center of said circular arrangement, said second radiator being excited from a carrier transmitter, and a monitor circuit for generating an output signal whenever the radiations of said ground station vary from predetermined signal tolerances, the combination comprising:

antenna first means for intercepting said ground station radiations in the near field and for separating the sideband signals therefrom;

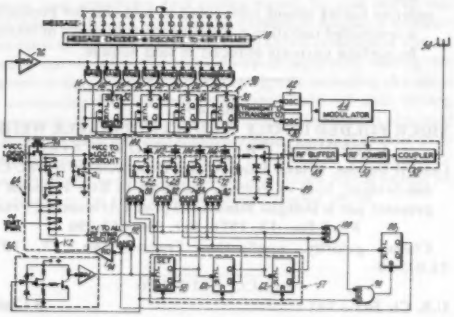
second means responsive to said separated sideband signals and to said commutating means for applying a discrete predetermined phase delay to said sideband signals during the commutation time of each of said first radiators;

and third means for mixing a portion of said carrier with the output of said second means to form a corrected input signal for said monitor circuit approaching the monitor circuit input obtainable if the antenna of said first means were located in the far field.

4,005,428
SECURE REMOTE CONTROL COMMUNICATION SYSTEMS

Jerry P. Graham, Fairfax, Va., assignor to Sound Technology, Inc., Enfield, Conn.

Filed May 15, 1975, Ser. No. 577,876
Int. Cl.² H04B 7/00
U.S. Cl. 343—228 20 Claims



1. A communications system comprising:

means for generating a plurality of carrier frequency signals individually in a preselected sequence;

means for modulating each of said carrier frequency signals in accordance with digitally coded information;

means for transmitting the modulated carriers in the sequence in which generated;

means for receiving the transmitted signals, said receiving means being initially responsive to only the first carrier frequency in the preselected sequence;

means for detecting the presence of modulation on each received carrier frequency signal and for generating a signal commensurate therewith;

means responsive to said signals commensurate with the presence of modulation provided by said detecting means for tuning the receiving means to the next carrier frequency in the preselected sequence; and

means responsive to said signals commensurate with the presence of modulation provided by said detecting means for storing a signal commensurate with the nature of the modulation, said storing means retaining the transmitted coded information at the end of a transmitting sequence.

4,005,429

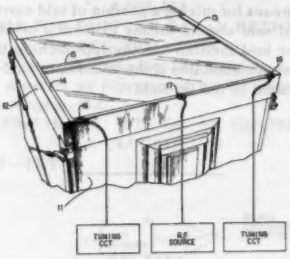
CAMOUFLAGED VHF ANTENNA

Kurt Ikrath, Elberon; William Kennebeck, Sea Bright, both of N.J.; Edward C. Shaffer, Augusta, Ga., and Peter J. Pingitore, Wayside, N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 8, 1975, Ser. No. 620,684

Int. Cl.² H01G 1/32

U.S. Cl. 343—713 6 Claims



1. In combination with a vehicle, or the like, having a metal body, an antenna which comprises:

a false, metal roof substantially co-extensive and parallel with the roof of said body, but spaced apart therefrom, said false roof having:

a U-shaped slot parallel to the left, right and rear edges of said false roof;

means for energizing said slot with a source of r.f. energy; and

antenna tuning means connected to said slot for producing a controlled radiation pattern at the frequency of interest by surface currents induced in said vehicle.

4,005,430

THICK FOLDED DIPOLE WHICH IS TUNEABLE WITHIN A FREQUENCY BAND OF TWO OCTAVES

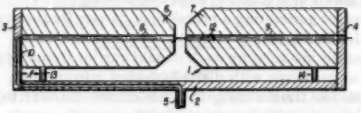
Gerard Dubost, Briand Rennes, and Henri Albert Havot, Cesson-Sevigne, both of France, assignors to Etat Francais represente par le Delegue Ministeriel pour l'Armement, France

Filed Jan. 12, 1976, Ser. No. 648,290

Claims priority, application France, Jan. 17, 1975, 75.01379

Int. Cl.² H01Q 9/26

U.S. Cl. 343—747 9 Claims



1. A thick folded dipole, comprising:

a. a folded strand having a bore hole;

b. a thick fed strand having a diameter which is about ten times greater than the diameter of said folded strand; said fed strand including two spaced apart symmetrical cylindrical half strands having ends in the form of conical frustums and coaxial bore holes;

c. a coaxial cable for carrying signals to be emitted or received by the dipole, said cable including a center conductor extending through the bore hole of said folded strand, the bore hole of one half strand, the space between said half strands and into the bore hole of the other half strand; and

d. symmetrical spaced apart short circuit means for matching the radiation impedance of the dipole by varying the distance between said short circuit means, said means being provided between said fed strand and said folded strand, wherein the operating frequency of the dipole is far less than the first resonance frequency.

4,005,431

SLOT ANTENNA WITH WAVEGUIDE COUPLING

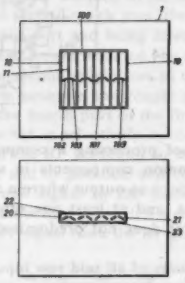
Anders B. Hammarström, Lindome, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed May 30, 1975, Ser. No. 582,085

Claims priority, application Sweden, June 26, 1974, 7408385

Int. Cl.² H01Q 13/10

U.S. Cl. 343—771 4 Claims



1. Antenna apparatus comprising: a plate having input and output sides; a plurality of first tracks cut into the output side of said plate, said first tracks being mutually parallel; a pair of second tracks cut into the output side of said plate, one of said second tracks being connected to first ends of each of said first tracks, and the other end of each of said second tracks being connected to second ends of each of said first tracks whereby a plurality of output-waveguide-wall-accepting means are formed, each having a major axis along a first direction; a pair of third tracks cut into the input side of said plate; a pair of fourth tracks cut into the input side of said plate, one of said fourth tracks being connected to first ends of said third tracks, and the other of said fourth tracks being connected to second ends of said third tracks whereby an input-waveguide-wall-accepting means is formed having a major axis which intersects the major axis of each of the formed output-waveguide-wall-accepting means; and said plate being provided with an opening in the region of each of the major axis intersections.

4,005,432

COMMUTATED LOG PERIODIC ANTENNA ARRAY FOR AUTOMATIC DIRECTION FINDING

Michael J. Beccario, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Nov. 11, 1975, Ser. No. 630,831

Int. Cl.² H01Q 3/24

U.S. Cl. 343—792.5 5 Claims

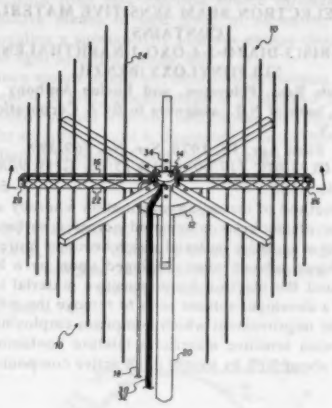
1. A commutated antenna array for amplitude modulating an RF signal to generate a cardioid pattern for use in automatic direction finding, comprising:

a plurality of log periodic antennas, each having coplanar parallel dipoles, arranged as equiangularly spaced radii in a circular geometric pattern with all the antenna dipoles being perpendicular to the plane of the circle;

a plurality of conductors, there being one connected to each antenna;

a common terminal for connection to radio signal equipment, and

commutating means for sequentially connecting said antenas to said common terminal via their respective conductors.

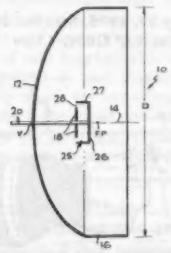


4,005,433

SMALL WAVELENGTH HIGH EFFICIENCY ANTENNA

George I. Tsuda, Fullerton, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Dec. 5, 1975, Ser. No. 638,101
Int. Cl.² H01Q 19/30
U.S. Cl. 343—819 20 Claims



1. An antenna comprising:

a paraboloidal reflector defining a circular opening of a diameter D, said opening being symmetrically aligned about an antenna longitudinal axis with the circular opening in a plane perpendicular to said axis, said paraboloidal reflector having a focal point on said axis;

feed means spaced apart from the vertex of said reflector and symmetrically positioned about said axis, at other than said focal point; and

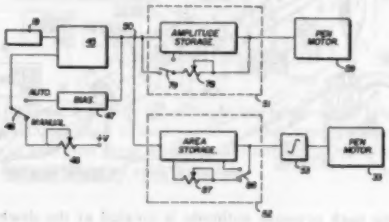
a circular cup-shaped cavity spaced symmetrically about said axis on the other side of said feed means remote from said reflector, with the open end of said cavity toward said reflector.

4,005,434

METHOD AND APPARATUS FOR GRAPHIC DENSITOMETER DISPLAY

Tipton L. Golias, and Gene A. Butts, both of Beaumont, Tex., assignors to Helena Laboratories Corporation, Beaumont, Tex.

Filed Mar. 24, 1975, Ser. No. 561,618
Int. Cl.² G01D 9/28
U.S. Cl. 346—1 14 Claims



1. In a method of graphically displaying optical density patterns of a sample of blood or the like for subsequent evaluation, including scanning said sample by relatively moving said sample and a light source and a photo-responsive element, converting the output of said photo-responsive element into analog signals with a converting circuit, and driving two display devices with said analog signals to provide graphical representations of the relative optical density and the cumulative optical desnity of said sample, respectively, the improvement of separately storing the maximum amplitude of said analog signals and the amplitude of said cumulative analog signals, and modifying said analog signals by said stored signals prior to driving said display devices to display a normalized optical density curve and a normalized cumulative optical density curve, respectively, said step of separately storing the maximum amplitude of the analog signals including the steps of comparing the instantaneous amplitude of said analog signals with the maximum prior stored analog signals obtained during said scan and if the instantaneous signal is greater than the prior stored maximum signal, actuating an oscillator and converting the oscillator output into a stored signal having an amplitude equal to the instantaneous analog signal.

4,005,435

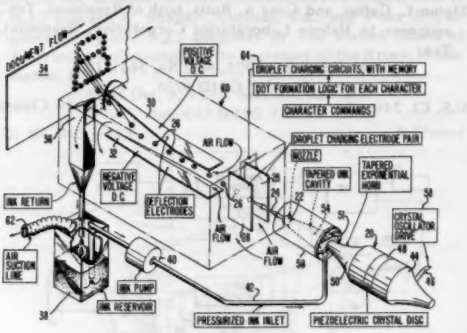
LIQUID JET DROPLET GENERATOR

David E. Lundquist, Birmingham, Mich.; Paul R. Hoffman, Exton, Pa.; Chauchang Su, W. Bloomfield Township, Mich.; Benjamin T. Sung, Southfield, Mich., and Steven A. Eichhardt, Bloomfield Township, Mich., assignors to Burroughs Corporation, Detroit, Mich.

Filed May 15, 1975, Ser. No. 577,667
Int. Cl.² G01D 9/00, 15/18; B01F 15/00
U.S. Cl. 346—1 16 Claims

1. The method of recording on a record member by use of liquid ink droplets which includes the steps of supplying ink to the wider end of a tapered cavity having a discharge orifice in the apex end thereof under such pressure that a jet stream is projected from the discharge orifice toward the record member, superimposing a cyclically varying pressure energy upon the liquid ink content of the cavity to cause the jet stream issuing from the discharge orifice to break up into a succession of separately spaced apart ink droplets which move in free flight toward the record member, and applying said pressure energy at such a frequency as to cause the establishment in the liquid ink content of the cavity of a standing wave pattern of

pressure nodes and antinodes and such that one such pressure node is located at the wider ink supplying end of the cavity



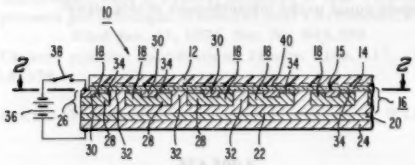
and one such pressure antinode is located at the discharge orifice.

4,005,436

APPARATUS FOR MAKING A RECORDING OF AN ELECTROSTATIC CHARGE PATTERN

Hans Peter Kleinknecht, Bergdietikon, Aargau, and Helmut Gustav Kiess, Niedersteinmaur, Zurich, both of Switzerland, assignors to RCA Corporation, New York, N.Y.

Filed July 10, 1975, Ser. No. 594,868
Int. Cl.² G11C 11/40; G03G 15/056
U.S. Cl. 346—153 **7 Claims**



1. Apparatus for making a recording of an electrostatic charge pattern disposed on an electrically insulating film comprising:

an array of a plurality of field-effect devices,

each of said devices comprising source and drain regions of one conductivity type separated from each other by a channel region of the opposite conductivity type adjacent one face of said array,

means to dispose said charge pattern adjacent to said one face,

means to apply a current-sensitive recording element adjacent an opposite face, to said one face, of said array, and

means in circuit with said source and drain regions to cause current to flow in each of said devices in accordance with the intensity of each elemental portion of said charge pattern adjacent a respective channel region of each of said devices whereby said current can flow through said recording element to change it in accordance with its intensity.

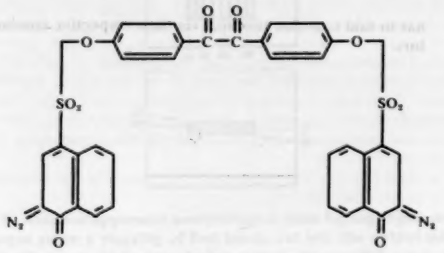
4,005,437

METHOD OF RECORDING INFORMATION IN WHICH THE ELECTRON BEAM SENSITIVE MATERIAL CONTAINS 4,4'-BIS(3-DIAZO-3-4-OXO-1-NAPHTHALENE SULFONYLOXY)BENZIL

Daniel Louis Ross, Princeton, and Lucian Anthony Barton, Trenton, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Apr. 18, 1975, Ser. No. 569,399
Int. Cl.² C07C 113/00; G01D 15/06; G11B 9/00
U.S. Cl. 346—165 **5 Claims**

1. In a method of recording information whereby a modulated beam of electrons is scanned across a surface of an electron beam sensitive material which becomes more soluble in a developer solvent when impinged upon by a beam of electrons and the electron beam sensitive material is developed with a developer solvent so as to remove the solubilized portion, the improvement which comprises employing as the electron beam sensitive material a mixture containing from about 1 to about 50% by weight of an active compound of the structure



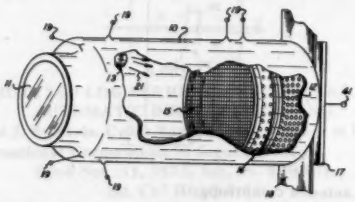
and an alkali-soluble resin.

4,005,438

DEVICE WITH CONTROL GRID FOR ELECTROSTATOGRAPHIC REPRODUCTION OF AN OPTICAL IMAGE

David W. Meltzer, Miami, Fla., and Narendra S. Goel, Henrietta, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed May 27, 1975, Ser. No. 581,011
Int. Cl.² G03G 15/04
U.S. Cl. 346—158 **13 Claims**



1. Apparatus for converting an optical image to an electrostatic image comprising:

an enclosure for maintaining an internal pressure below atmospheric pressure;

an array of electrically conducting elements, forming one wall of said enclosure;

a source of electrons located in said enclosure, said electron source including means for propagating electrons generally toward said array of elements;

light sensitive means disposed between said electron source and said array of elements, said light sensitive means

having a multiplicity of apertures permitting passage of electrons from said electron source through said light sensitive means to said array of elements; means for providing a substantially uniform charge distribution on said light sensitive means, and

entrance means in said enclosure for permitting a radiation likeness of said optical image to be applied to said light sensitive means whereby said charge distribution on said light sensitive means is dissipated in accordance with the radiation likeness of said optical image.

4,005,439

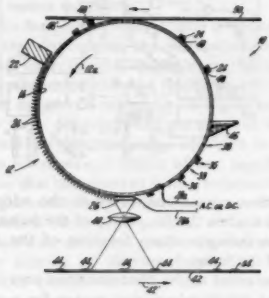
MAGNETIC IMAGING METHOD FOR PHOTOCOPYING

Sidney Levy, 145 W. Cuthbert Blvd., Oaklyn, N.J. 08107

Filed Jan. 28, 1975, Ser. No. 544,814

Int. Cl.² G03G *19/00*

U.S. Cl. 346—74.1 **19 Claims**



1. A magnetic imaging apparatus comprising a layer of magnetic material, selected surface portions of which may be magnetized and demagnetized upon local application of corresponding magnetic fields; a photoconductive layer selected surface portions of which exhibit changes in resistivity as a function of light intensity of an image impinging thereon; a source of electrical potential applied to said photoconductive layer to permit the generation of a current density over said photoconductive layer which corresponds to an image intensity distribution impinging on said photoconductive layer, said current density generating a magnetic field having a distribution over said photoconductive layer which corresponds to said current intensity distribution, said photoconductive layer being proximate to said layer of magnetic material, whereby selected portions of said magnetizable layer may be magnetized and demagnetized by said magnetic field distribution; magnetic ink supply means for imparting magnetic ink to said magnetic layer at the magnetized portions thereof; and means for transferring said ink from said magnetic layer to a surface on which the image is to be reproduced.

4,005,440

PRINTING HEAD FOR INK JET PRINTER

Jan Roger Amberntsson; Rober Ingemar Andersson, both of Angered, and Stig Bertil Sultan, Floda, all of Sweden, assignors to Facit Aktiebolag, Atvidaberg, Sweden

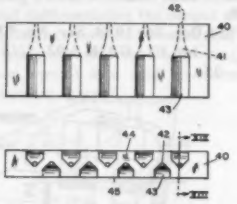
Filed Mar. 10, 1975, Ser. No. 557,228

Claims priority, application Sweden, Mar. 12, 1974, 7403312; Oct. 1, 1974, 7412233

Int. Cl.² G01D *15/18*

U.S. Cl. 346—140 A **5 Claims**

1. Printing head for an ink jet printer comprising a first plate having spaced channels in one surface of said first plate, a separate plate having a pumping chamber for each of said channels and means for pumping fluid in each of said chambers, a plurality of capillary tubes each opening into another surface of said first plate, means connecting one end of each of said channels to a respective one capillary tube, one end of each of said capillary tubes forming an orifice for exiting the drops of printing fluid, each of said capillary tubes tapering in the direction from said channels to the opening of said tube



and lying substantially in a straight line relative to a respective channel, and each of said capillary tubes opening into a surface of said first plate which is substantially perpendicular to the large surfaces of said first plate.

4,005,441

PHOTOMETRIC DEVICE OF THROUGH THE LENS TYPE EXPOSURE METER IN A SINGLE-LENS REFLEX CAMERA

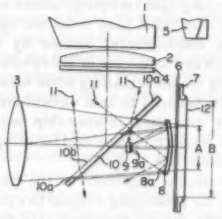
Jun Shimomura, Tokyo, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed July 22, 1975, Ser. No. 598,040

Claims priority, application Japan, July 31, 1974, 49-90603[U]

Int. Cl.³ G03B *17/00*

U.S. Cl. 354—23 R **6 Claims**



1. A single lens reflex camera comprising:

an objective;

a view finder optical system;

beam splitting means for reflecting part of a light beam passing through said objective to said view finder optical system and for transmitting the remainder of the light beam;

a light reflecting and concentrating member of which the optical axis coincides substantially with that of said objective, said light reflecting and concentrating member being positioned behind said beam splitting means in the direction of travel of light beam transmitted through said beam splitting means; and

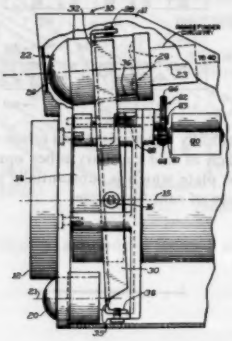
photoelectric converting means positioned between said beam splitting means and said light reflecting and concentrating member and substantially on the optical axis of said objective, the light receiving surface of said photoelectric converting means facing said light reflecting and concentrating member to receive the light beam reflected and concentrated by said reflecting and concentrating member.

4,005,442

AUTOMATIC FOCUSING MECHANISM

John A. Gallagher, Barrington, and Milan A. Broderick, Riverwoods, both of Ill., assignors to Bell & Howell Company, Chicago, Ill.

Filed Dec. 26, 1974, Ser. No. 536,667
Int. Cl.² G03B 3/02, 3/10
U.S. Cl. 354—25 9 Claims



1. An automatic focusing mechanism for an optical instrument with an objective lens having an adjustable focusing cell for maintaining the focus setting of said objective lens in correspondence with the distance between said optical instrument and an object, said mechanism comprising:

means for emitting a beam of light from the optical instrument to the object;

means defining a longitudinal axis, spaced from said emission means, for receiving the image of said light beam reflected from said object; said reception means having detection means for producing an output corresponding to the alignment of said longitudinal axis of said reception means with said reflected light beam;

means for pivoting said reception means so that said reception means may track said reflected light beam through the angular displacement caused by variations in the distance between said optical instrument and said object; said pivoting means including plate means having a distal end pivotally secured to said optical instrument, a proximal end in mounting relationship with said reception means, and means coupling said focusing cell to said plate means intermediate said ends;

a rangefinder circuit, responsive to the output of said detection means, for producing a signal to operate a motor; and

a motor, having means engaging said pivoting means for pivotal movement of said reception means, responsive to said signal to move said reception means so that the longitudinal axis thereof is in alignment with said reflected light beam, thereby maintaining the focus setting of said objective lens in correspondence with the distance between said optical instrument and the object.

4,005,443

SCANNING DEVICE AND METHOD FOR AUTOMATIC FOCUSING

Fritz Albrecht, Rte. 4, Box 240, Brevard, N.C. 28712

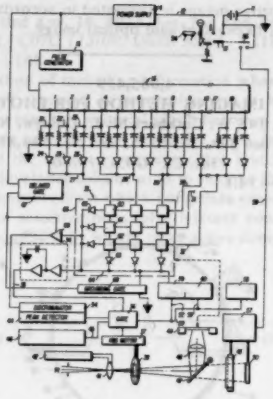
Filed Sept. 11, 1975, Ser. No. 612,295
Int. Cl.² G03B 7/08
U.S. Cl. 354—25 4 Claims

1. A device for automatically focusing an image in an optical system comprising:

a photosensitive array having a plurality of discrete sites positioned in the focal plane of the optical system to dissect the image into segments crosswise and determine the light intensity at each segment,

means interposed in the focal plane to vary the focus of the image, the illumination of the photosensitive array being dependent on the degree of focus of the image, said discrete sites having a charge produced depending on the degree of illumination,

plural means to scan vertically and horizontally the photosensitive array and read out the charges on said discrete sites to form a pulse train, and



discrimination means connected to the address means to determine when the frequency of the pulse train is maximized to indicate sharp focusing of the image, as the focus of the image is varied;

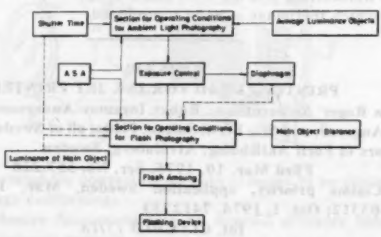
means connected to the photosensitive array to delay activation of the discrimination means for a predetermined time sufficient to clear spurious charges from sites on the photosensitive array to preclude erroneous indication of sharp focusing of the image.

4,005,444

EXPOSURE CONTROL SYSTEM FOR FLASH PHOTOGRAPHY

Takashi Uchiyama, Yokohama; Yukio Mashimo, Tokyo; Tetsuya Taguchi, Kawasaki, and Zenzo Nakamura, Urawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 399,743, Sept. 21, 1973. This application July 15, 1974, Ser. No. 488,441
Claims priority, application Japan, Sept. 25, 1972, 47-95998; Dec. 27, 1972, 48-3923
Int. Cl.² G03B 7/14, 7/16
U.S. Cl. 354—27 32 Claims



1. An exposure interval preselection flash exposure control system for a camera, said camera including a shutter mechanism, comprising:

an adjustable camera-diaphragm device for limiting an exposure light in accordance with a scene brightness under natural light, said device including:

photoresponsive means having a first photoresponsive

element responsive to the luminance of objects to be photographed;

shutter interval setting means for permitting the preselection of shutter speed;

a computing circuit coupled to said photoresponsive means and shutter interval setting means for computing the exposure aperture of the diaphragm corresponding to circuit parameters derived from said photoresponsive means and shutter interval setting means;

a diaphragm aperture adjusting means connected with said diaphragm device for setting the aperture value of the diaphragm, the adjusting means being operatively connected to said computing circuit; and

a means connected with said diaphragm aperture adjusting means for generating an electrical signal correspondng to a diaphragm aperture adjusted value, and

a flash device including means for controlling the amount of flash energy in response to the exposure aperture value determined by said computing means, said flash energy control means including:

means for forming a control signal in accordance at least, with the distance to the subject of principal photographic interest, said forming means including a second photoresponsive element responsive to the luminance of the subject of principal photographic interest in a scene to be photographed the element having a delaying characteristic the value of which is representative of the luminance of object after a significant time period so that the element is non-responsive to the flashing light constituent of the luminance of object;

timing means electrically coupled to said forming means and said electric signal generating means for a measure of an interval of time correspondng to the control signal in consideration of the value of said second photoresponsive element, whereby an appropriate exposure is provided for the main portion and other portion of the object by illumination of external light and to the main portion of the subject by illumination of an auxiliary light and the external light corresponding to the preset shutter speed respectively;

switching means, electrically coupled to said timing means, having the duration of its conducting state controlled by the time interval measure;

power source means for providing flash energy; and

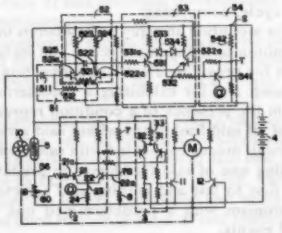
flash discharge means coupled by way of said switching means to said power source means.

4,005,445

AUTOMATIC EXPOSURE CONTROL MEANS

Kunio Ando, Warabi, Japan, assignor to Fuji Photo Optical Co., Ltd., Omiya, Japan

Filed Feb. 15, 1974, Ser. No. 442,755
Claims priority, application Japan, Apr. 4, 1973, 48-38580
Int. Cl.² G03B *7/08*
U.S. Cl. 354—44 **5 Claims**



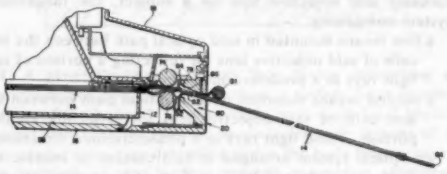
1. In an automatic exposure control means for a camera wherein a diaphragm of the camera is controlled by a servomotor which is actuated with an imbalance output of a bridge circuit including aa an element thereof a photodetector to receive light from the object to be photographed, said imbalance output of the bridge circuit being amplified by a transistor amplifier, the improvement comprising a servomotor braking means including a differentiation circuit connected to said photodetector and differentiating the output of said photodetector and an amplifier connected between said differentiation circuit and said transistor amplifier for putting the output of the differentiation circuit into said transistor amplifier to control emitter current thereof.

4,005,446

PHOTOGRAPHIC FILM PROCESSING APPARATUS

Harvey S. Friedman, Natick, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Jan. 13, 1976, Ser. No. 648,638
Int. Cl.² G03B *17/50*
U.S. Cl. 354—86 **11 Claims**



1. Photographic apparatus comprising:

means for receiving and locating a stacked array of resiliently flexible, substantially flat, rectangular self-processable film units with a foremost one in position for exposure, each of the film units having a leading edge and a trailing edge spaced from its leading edge and including a container of processing fluid mounted adjacent its leading edge, each of the film units thus arranged to have its fluid spread across preselected portions thereof as a pressure is progressively applied to it from its leading to its trailing edge;

a pair of juxtaposed fluid spreading rollers that form an elongated pressure generating gap between them that is positioned to receive the leading edge of a foremost film unit after its exposure to progressively apply a pressure to the film unit as it advances therethrough;

means for defining an elongated film exit and for releasably gripping the film unit when a portion thereof is disposed in said exit, said exit being offset with respect to the path of travel that the leading edge of the film unit would normally follow as it emerges from said gap, said exit further being positioned so that a major portion of the film unit extends therethrough and outside of said apparatus when the trailing edge of the film unit leaves said gap;

actuable means for advancing the foremost film unit from said exposure position and introducing its leading edge into said gap;

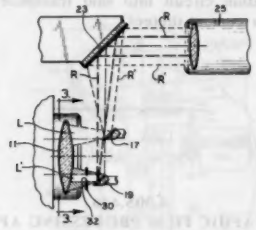
actuable means for driving at least one of said rollers to advance the foremost film unit through said gap; and

means for engaging the leading edge of the foremost film unit and directing it toward said exit as the foremost film unit is being advanced through said gap and for preventing the trailing edge of the foremost film unit, when it leaves said gap, from flipping out of said normal path of travel under the influence of its resiliently flexible characteristic so that the leading edge of the next film unit advancing through said gap will engage the trailing edge of the prior advanced film unit to push it entirely outside of said apparatus.

4,005,447
DUAL BEAM RANGEFINDER

Danny Filipovich, Chicago, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Filed June 2, 1975, Ser. No. 582,702
Int. Cl.² G03B *13/20*
U.S. Cl. 354—166 **7 Claims**



1. In a single lens reflex camera having a viewfinder system and an objective lens defining an optical path between first and second lens cells, said first lens cell transmitting light rays along said optical path, a rangefinder system to facilitate focusing said objective lens on a subject, the rangefinder system comprising:

a first means mounted in said optical path between the lens cells of said objective lens for reflecting a portion of said light rays in a predetermined direction;

a second means mounted in said optical path between the lens cells of said objective lens for reflecting another portion of said light rays in a predetermined direction;

an optical system arranged in said camera to receive the light rays reflected by said first and second reflecting means to form a superimposed image in a predetermined plane in said viewfinder system when the objective lens is in focus on the subject and to form separate images in said plane when the objective lens is not focused on the subject; and

means mounted in said optical path for masking from one of said reflecting means a sufficient amount of the off-axis light rays otherwise incident thereto to restrict the transmission of the image from said one reflecting means to a finite central portion of the predetermined plane of said viewfinder, thereby limiting the superimposition of said images to said central portion.

4,005,448
PROGRAMMED SHUTTER

Hiroshi Iwata, Osaka, and Katsuji Ishikawa, Daito, both of Japan, assignors to West Electric Company, Ltd., Osaka, Japan

Filed Oct. 31, 1974, Ser. No. 519,653
Claims priority, application Japan, Nov. 5, 1973, 48-124806; Dec. 28, 1973, 49-2837
Int. Cl.² G03B *7/08, 9/02*
U.S. Cl. 354—30 **13 Claims**

1. A programmed shutter comprising:

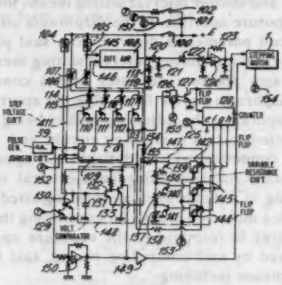
a plurality of blades adapted to serve both as shutter blades and as diaphragm blades;

a reversible stepping motor operatively connected to said blades to actuate same when the motor is energized, said stepping motor comprising first and second concentric rings rotatably related to one another and having a central opening through which light may pass, means for pivotally connecting said first ring to the blades, and means for slidably connecting the second ring to said blades whereby during relative rotation of the first and second rings the blades move with respect to one another to vary the amount of light passing through said opening;

gating means joined to said motor;

a pulse generator operatively connected to said gating means;

means responsive to brightness for controlling said gating means to develop a predetermined number of pulses at the output of the gating means to step the motor in one direction thereby opening the blades to an aperture value which is a function of the brightness; and

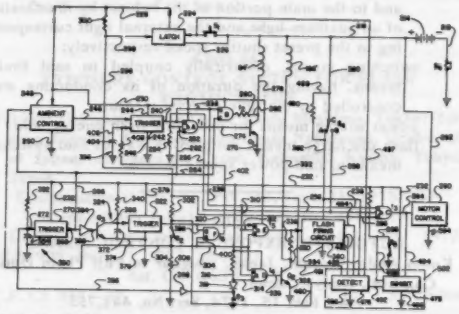


means responsive to both the brightness and said aperture value for controlling said gating means, after a period of time which is a function of the brightness and aperture value, to apply pulses to the motor to step the motor in a reverse direction thereby closing the blades.

4,005,449
FLASH PHOTOGRAPHIC SYSTEM WITH CAMERA INHIBIT FEATURE

Seymour Ellin, Chestnut Hill, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation of Ser. No. 424,551, Dec. 13, 1973, abandoned.
This application June 24, 1974, Ser. No. 482,379
Int. Cl.² G03B *15/04*
U.S. Cl. 354—128 **18 Claims**



1. A flash exposure system for use with photographic apparatus of a variety actuable to automatically carry out a sequence of operational events from first to last defining a photographic cycle, comprising:

means for mounting an array of flashlamps in an orientation for ignition to illuminate a scene and including terminals means for providing electrical connection with each said flashlamp and for exhibiting a predetermined electrical state in the presence of a condition representing an ignition of all said flashlamps within said array;

firing circuit means connected with said terminal means for selecting one of said flashlamps in predetermined order from first to last and igniting said selected flashlamp in synchronism with a predetermined one of said operational events;

electrical detector means responsive to said terminal means electrical state for deriving a unique electrical signal condition representative thereof, said detector means including:

a comparison network coupled with said terminal means,

said comparison network incorporating said predetermined electrical state as a compared component thereof and providing a predetermined output condition in the presence of said terminal means electrical state, and

a differential amplifier means responsive to said predetermined output condition for deriving said unique electrical signal condition; and

inhibit means responsive to said unique electrical signal condition for preventing the carrying out of select said operational events following the completion of a number of photographic cycles expending all said arrayed flashlamps in said orientation to illuminate a scene.

4,005,450

INSULATED GATE FIELD EFFECT TRANSISTOR HAVING DRAIN REGION CONTAINING LOW IMPURITY CONCENTRATION LAYER

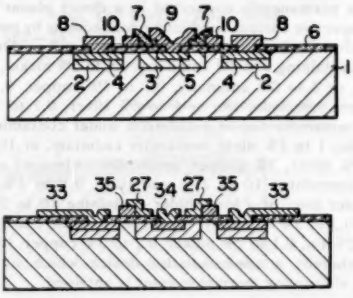
Isao Yoshida, Nishitama; Takeshi Tokuyama, Higashikurume; Shigeru Nishimatsu, Kokubunji, and Takahide Ikeda, Kodaira, all of Japan, assignors to Hitachi, Ltd., Japan

Continuation-in-part of Ser. No. 391,047, Aug. 24, 1973, abandoned, which is a division of Ser. No. 142,933, May 13, 1971, Pat. No. 3,787,962. This application Dec. 16, 1974, Ser. No. 532,923

Claims priority, application Japan, May 13, 1970, 45-40114

Int. Cl.² H01L *29/78*

U.S. Cl. 357—23 **13 Claims**



1. An insulated gate field effect transistor comprising:

a semiconductor substrate of a first conductivity type;

a source region of a second conductivity type, opposite said first conductivity type and having an impurity concentration higher than that of said substrate, disposed in a first surface portion of said substrate and defining with said substrate a first p-n junction which extends to the surface of said substrate;

a drain region disposed in a second surface portion of said substrate spaced apart from said source region by a third surface portion of said substrate therebetween, said drain region comprising

a first semiconductor region having a second conductivity type and forming a second p-n junction with said substrate which extends to the surface of said substrate, and

a second semiconductor region having said second conductivity type and an impurity concentration higher than the impurity concentration of said first region and the same as that of said source region, disposed in a surface portion of said first region and being separated from said third surface portion of said substrate by said first semiconductor region therebetween;

a first insulating film disposed on said substrate at least between said source and drain regions;

a gate electrode disposed on said first insulating film between said source and drain regions so that one edge of said gate electrode is aligned with the termination of said first p-n junction at the surface of said substrate, and the other edge of said gate electrode opposing to said one edge of said gate electrode is aligned with the termination of said second p-n junction at the surface of said substrate;

a second insulating film disposed on said second surface portion of said substrate at least between said third surface portion and said second semiconductor region; and

electrodes connected to said source region and to said second semiconductor region, respectively.

4,005,451

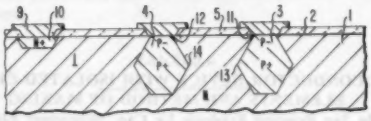
LATERAL CURRENT DEVICE

Ramon Ubaldo Martinelli, Hightstown, and Henry Kressel, Elizabeth, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed May 5, 1975, Ser. No. 572,615

Int. Cl.² H01L *29/72, 29/06*

U.S. Cl. 357—35 **9 Claims**



1. A generally lateral current flow device comprising a semiconductor body having a surface, a surface layer on said surface of the body of a nature liable to perturb local lateral current flow therein, first and second electrode regions of a first conductivity type extending within the body from respective portions of said surface thereof, respective electrical access terminals on the body contacting at said surface the first and second electrode regions, a third electrode region of a second conductivity type lying between the first and second electrode regions and having an outer portion located along and close to the surface of the body and an inner portion lying less close thereto, a third electrical access terminal on the body contacting a region of said surface thereof located other than between the first two surface regions but being in electrical communication with the third electrode region; and the improvement providing a relative configuration of the first and second electrode regions leading to a shorter distance between them through said inner portion of the third region than that through said outer portion thereof.

4,005,452

METHOD FOR PROVIDING ELECTRICAL ISOLATING MATERIAL IN SELECTED REGIONS OF A SEMICONDUCTIVE MATERIAL AND THE PRODUCT PRODUCED THEREBY

Charles R. Cook, Jr., North Palm Beach, Fla., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Nov. 15, 1974, Ser. No. 524,296

Int. Cl.² H01L *27/12*

U.S. Cl. 357—49 **37 Claims**

1. A method for providing electrical isolation regions in a semiconductive material, comprising the steps of:

forming a protective dielectric layer on a surface of the semiconductive material;

removing the dielectric and a portion of the semiconductive material in said regions;

depositing a metal over said surface to cover both the regions and the dielectric layer, said metal having a thickness so that the metal on the dielectric layer does not contact the metal in the regions;

anodizing the metal in the regions by submerging the semiconductive material into an anodizing solution and applying and anodizing potential to the metal in the regions so that the metal in the regions becomes an anode and is anodized to form a dielectric insulating material in the regions, the metal on the dielectric layer remaining unanodized because of the electrical insulation provided by the dielectric layer which separates the metal from the semiconductive material; and

removing the unanodized metal from the dielectric layer by etching in a solution that does not attack the anodized metal.

4,005,453

SEMICONDUCTOR DEVICE WITH ISOLATED CIRCUIT ELEMENTS AND METHOD OF MAKING

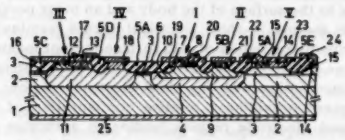
Claude Jan Principe Frederic Le Can, Nijmegen; Else Kooi, Eindhoven, and Walter Steinmaier, Nijmegen, all of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 399,860, Sept. 24, 1973, Pat. No. 3,909,318, which is a division of Ser. No. 237,460, March 23, 1972, abandoned. This application Jan. 9, 1975, Ser. No. 539,634

Claims priority, application Netherlands, Apr. 14, 1971, 7105000

Int. Cl.² H01L *27/12, 27/04, 29/34, 29/06*

U.S. Cl. 357—49 **6 Claims**



1. A semiconductor device comprising a semiconductor body having a lower region of a first conductivity type, a first epitaxial layer on said lower region, a second epitaxial layer on said first epitaxial layer and having an upper surface, a first buried layer of a second conductivity type present in the body and extending from said lower region up through the first epitaxial layer and having its maximum impurity concentration at the lower region - first layer interface, a second buried layer of said first conductivity type present in the body and extending between said first buried layer and into the second epitaxial layer and having its maximum impurity concentration at the first layer-second layer interface, a pattern of insulating material inset in the second layer, said inset insulating material pattern including a first portion substantially entirely surrounding a region of second layer and adjoining the first buried layer along is preipheral portions and having a second portion within the first portion and dividing the said second layer region into at least a first island region and a second island region enclosed laterally by the first insulating pattern portion and below by the first buried layer, said first and second island regions both adjoining the first buried layer, said second island region being of the first conductivity type, said second insulating pattern portion being spaced from the first buried layer by at least a part of the thickness of the second buried layer, and a first semiconductor circuit element built at least partly in the first island region.

4,005,454

SEMICONDUCTOR DEVICE HAVING A SOLDERABLE CONTACTING COATING ON ITS OPPOSITE SURFACES

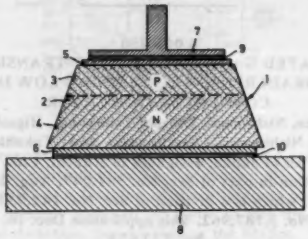
Helmut Froloff, Schwabach, and Theodor Tovar, Bubenreuth, both of Germany, assignors to Semikron Gesellschaft fur Gleichrichterbau und Elektronik m.b.H., Nurnbeg, Germany

Filed Mar. 26, 1976, Ser. No. 670,826

Claims priority, application Germany, Apr. 5, 1975, 2514922

Int. Cl.² H01L *23/48, 29/40, 29/46, 29/62*

U.S. Cl. 357—65 **5 Claims**



1. In a semiconductor device including a disc of semiconductor material having at least one pn-junction and solderable contacting coatings on its opposed major surface which coatings are permanently connected in a direct planar manner with respective current conducting connections by means of a soft solder; the improvement wherein said soft solder is a tin solder containing 3 to 8% antimony, 0.1 to 2% nickel, remainder tin, or 3 to 8% antimony, 0.1 to 3% copper, 0.1 to 2% cadmium, remainder tin, or 1 to 6% silver, 0.1 to 2% cadmium, remainder tin; or a cadmium solder containing 10 to 25% zinc, 1 to 5% silver, remainder cadmium, or 10 to 25% zinc, 5% silver, 3% copper, remainder cadmium; or a zinc solder containing 10 to 25% cadmium, 0.1 to 3% copper, remainder zinc; or a lead solder containing 10 to 20% cadmium, 0.3 to 5% antimony, remainder lead, or 1 to 5% silver, 0.5 to 2% tin, 0.1 to 2% nickel, 0.1 to 3% copper, remainder lead, whereby a semiconductor device which is resistant against alternating thermal stresses is obtained.

4,005,455

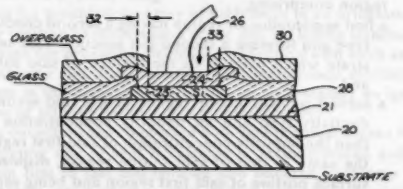
CORROSIVE RESISTANT SEMICONDUCTOR INTERCONNECT PAD

Willis George Watrous, Jr., Mountain View, and Robert T. Jenkins, Byron, both of Calif., assignors to Intel Corporation, Santa Clara, Calif.

Filed Aug. 21, 1974, Ser. No. 499,184

Int. Cl.² H01L *29/34, 29/04, 23/48, 23/28*

U.S. Cl. 357—71 **9 Claims**



1. In a semiconductor device having a substrate which includes at least a first insulative layer disposed thereon, a contact pad for providing electrical coupling between external leads, circuit interconnections and diffused regions contained within said substrate comprisin;

a semiconductor layer overlying at least a portion of said first insulative layer;

a second insulative layer overlying said first insulative layer and contiguous with said semiconductor layer, wherein said second insulative layer may contain corrosive agents;

a conductive layer overlying at least said semiconductor layer but having minimal contact with said second insulative layer;

a third insulative layer overlying at least said second insulative layer and a portion of said conductive layer, said conductive layer being in substantial contact only with said third insulative layer and said semiconductor layer; and

a lead member disposed on a central portion of said conductive layer so that said lead member is electrically coupled to said semiconductor layer even though electrical parameters of exposed portions of said conductive layer are substantially degraded;

thereby preventing corrosion due to impurities contained within said second insulative layer.

4,005,456

CONTACT SYSTEM FOR SEMICONDUCTOR ARRANGEMENT

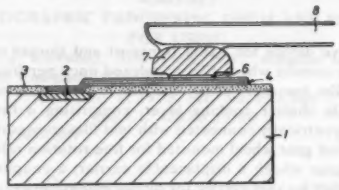
Leonhard Botzenhardt, Heilbronn, Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed Feb. 10, 1975, Ser. No. 548,889

Claims priority, application Germany, Feb. 27, 1974, 2409312

Int. Cl.² H01L *23/48, 29/46*

U.S. Cl. 357—71 **7 Claims**



1. In a semiconductor arrangement including a semiconductor body, a metal layer arranged on a surface of said semiconductor body with said metal layer having, at least on the outside, a vapor deposited or sputtered layer of gold, and a connection region of gold deposited electrolytically on said metal layer and being thicker than said metal layer; the improvement wherein a layer of palladium is arranged between, and in direct contact with, said gold layer and said thicker connection region of gold.

4,005,457

SEMICONDUCTOR ASSEMBLY, METHOD OF MANUFACTURING SAME, AND BONDING AGENT THEREFOR

Michael Hill, Tarrytown, N.Y.; Josef Intrater, Englewood Cliffs, N.J., and Tugrul Yasar, El Paso, Tex., assignors to Semimetals, Inc., Westbury, N.Y.

Filed July 10, 1975, Ser. No. 594,707

Int. Cl.² H01L *33/00, 23/48, 29/44, 29/48*

U.S. Cl. 357—72 **27 Claims**

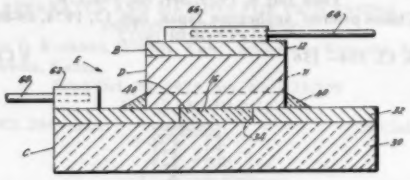
1. A semiconductor assembly comprising

A. a semiconductor having opposed first and second surfaces;

B. a substrate supporting said semiconductor, said substrate including a first electrode bonded to and in electrically conductive contact with said first surface;

C. a cover supported by said semiconductor, said cover comprising an electrically insulating layer and a second electrode comprising a pattern of metallization disposed on the surface of said insulating layer adjacent said semiconductor; and

D. cure-shrunk adhesive bonding means physically bonding



together said semiconductor and said second electrode, with said second semiconductor surface and said second electrode in electrically conductive contact, said semiconductor and said second electrode being bonded together essentially exclusively by said adhesive bonding means.

4,005,458

LIGHT MEASURING DEVICE FOR A SINGLE LENS REFLEX CAMERA WITH A PENTAGONAL PRISM

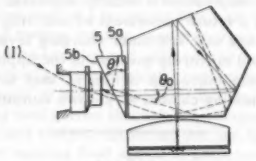
Youichi Okuno, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 288,444, Sept. 12, 1972, abandoned. This application Oct. 25, 1974, Ser. No. 518,160

Claims priority, application Japan, Sept. 16, 1971, 46-72073; Sept. 16, 1971, 46-72075; Sept. 16, 1971, 46-72074

Int. Cl.² G03B *19/12, 13/06*

U.S. Cl. 354—155 **15 Claims**



1. A single lens reflex camera comprising:

a pentagonal roof prism having a plurality of surfaces including a light entrance surface and a light exit surface,

optical means for directing light from an objective lens in the camera toward the entrance surface,

said surfaces being arranged to cause light incident upon said entrance surface from said optical means to emerge from the exit surface,

an eyepiece near the exit surface for receiving light emerging from said exit surface,

a photosensitive device near said exit surface for receiving light emerging from said exit surface;

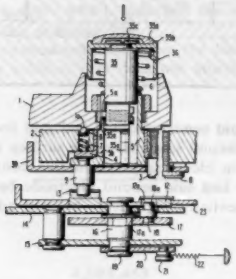
an optical element positioned in the path of light emerging from the exit surface and arranged to guide light emerging from the exit surface, and travelling toward the photosensitive device from one group of directions, toward the photosensitive device, and to guide light emerging from the exit surface, and travelling toward the photosensitive device from another group of directions, away from the photosensitive device.

4,005,459

INTERLOCKED MANUAL STOP-DOWN AND MIRROR-UP MECHANISM FOR SINGLE LENS REFLEX CAMERA

Takumi Kobayashi, Asaka, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed July 8, 1975, Ser. No. 594,178
Claims priority, application Japan, July 12, 1974, 49-80348
Int. Cl.² G03B 19/12
U.S. Cl. 354—156 6 Claims



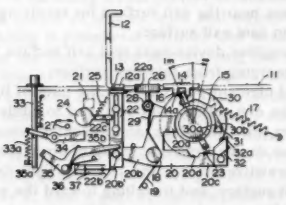
1. In a single lens reflex camera including a camera body, a self-timer mechanism within said body, a manual lens stopping-down mechanism within said body, and a mirror-up mechanism, the improvement wherein: said self-timer mechanism comprises a self-timer charging lever pivoted to said body for movement in a first direction between an initial, uncharged position and a charged position at an angle thereto and in a second direction between said initial position and a mirror-up position angularly displaced therefrom, and wherein a stop button is coaxially mounted at said self-charging lever pivot point for limited depression to effect a stopping-down operation when said self-timer charging lever is located at its initial position, and said camera comprises mechanical interlock means responsive to initial depression of said stop button with said self-timer charging lever at said initial position for preventing initiation of a mirror-up operation unless said stop button is initially depressed prior thereto, and to prevent a return movement of said stop button, after depression, unless said self-timer charging lever is manually rotated from said mirror-up position in the opposite direction to that achieving mirror-up action to said initial position, therefore terminating camera stop-down condition.

4,005,460

PHOTOGRAPHIC CAMERA WITH COVER FOR EXPOSURE CONDITIONS SELECTOR MEANS

Shigeo Mizukawa, Ageo, Japan, assignor to Fuji Photo Optical Co., Ltd., Omiya, Japan

Filed June 10, 1975, Ser. No. 585,653
Claims priority, application Japan, June 19, 1974, 49-69493
Int. Cl.² G03B 3/00
U.S. Cl. 354—202 8 Claims



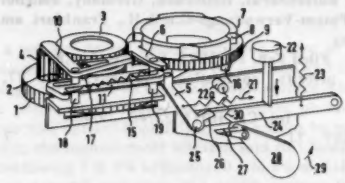
1. A photographic camera comprising a camera body, an exposure controlling means provided in the camera body for controlling exposure of film loaded in the camera body, an exposure condition selecting means provided on the camera body for selecting between normal exposure condition and other exposure condition, and a cover provided on the camera body movable between an open and a closed position, in which closed position the cover prevents said exposure condition selecting means from being manually operated and causes said exposure controlling means to operate in the state of normal exposure condition, and in the open position the cover allows said exposure condition selecting means to be manually operated.

4,005,461

DRIVING DEVICE FOR FILM TRANSPORT AND SHUTTER COCKING LEVER FOR A CAMERA

Karl Heinz Lange, Bunde, Germany, assignor to Balda-Werke Photographische Gerate & Kunststoff GmbH & Co. KG, Bunde, Germany

Filed Feb. 24, 1976, Ser. No. 660,758
Claims priority, application Germany, Mar. 12, 1975, 2510724
Int. Cl.² G03B 17/42
U.S. Cl. 354—204 13 Claims



1. A drive device for a film transport and shutter cocking lever for a camera whose film is indexed once per frame and having a film transport wheel coupled to a spool core and a displaceable shutter cocking lever, comprising a first gear wheel concentrically connected with said film transport wheel and a second gear wheel mounted for free rotation relative to said first gear wheel; a displaceable carrier; a coupling gear wheel carried by said carrier for displacement between a first position at which said coupling gear wheel simultaneously engages said first and second gear wheels and a second position at which said coupling gear wheel is out of such engagement; a moving surface formed with notches therein and operatively coupled to said second gear wheel for displacement thereby, a pivotably mounted pawl; means for biasing said pawl against said moving surface to position said pawl in an inwardly position when resting in one of said notches and an outwardly position when out of said notches; and means selectively coupling said carrier, pawl and shutter cocking lever so that the position of said carrier in one of its first and second positions depends on the respective positions of said pawl and shutter cocking lever, said carrier being positioned in its first position at at least one position of each of said pawl and shutter cocking lever.

4,005,462

DOUBLE SLIDE FOCAL PLANE SHUTTER

Friedrich Papke, Braunschweig, Germany, assignor to Rollei-Werke Franke & Heidecke, Braunschweig, Germany

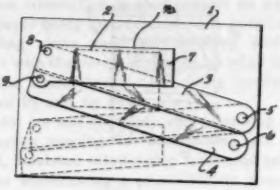
Filed Dec. 3, 1975, Ser. No. 637,308
Claims priority, application Germany, Dec. 7, 1974, 2458005
Int. Cl.² G03B 9/20, 9/08
U.S. Cl. 354—246 6 Claims

1. In a double slide focal plane shutter for photographic cameras, a multiple element slide disposed in front of an image aperture defined by partitioning means or the like in the cameras, the slide comprising:

a lamella covering only a portion of the image aperture in the camera, and having a slit defining edge;

a plurality of flat arms disposed in at least partially overlapping extension parallel to each other, at least two of the arms having one end pivotally linked to said lamella;

a plurality of spaced apart pivot points for pivotally mounting respectively one end of each of said arms, including the respective other ends of the said two arms, to a stationary portion of and in the camera housing, so that all of



the arms being linked to the lamella operate as a parallelogram-like linkage for the lamella and the lamella is moved in front of the aperture whereby the edge retains its orientation; and

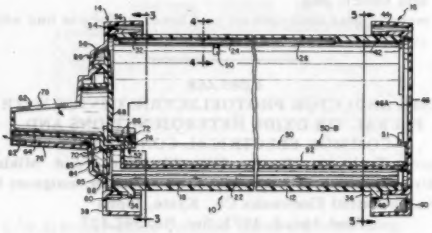
the arms together and in each position covering also that portion of the aperture opposite the said slit defining edge and not covered by the lamella when in front of the aperture, whereby each of said arms covers a portion of the aperture not covered by any of the other arms.

4,005,463

PHOTOGRAPHIC PROCESSING DRUM AND METHOD FOR USING

Charles J. Kowalski, New York, N.Y., assignor to Charles Beseler Company, Florham Park, N.J.

Filed July 8, 1975, Ser. No. 593,986
Int. Cl.² G03D *17/00*
U.S. Cl. 354—307 **19 Claims**



1. A photographic processing drum comprising a tubular body member,

a trough mounted within said body member and spaced apart from the interior surface thereof, the longitudinal axis of said trough being substantially parallel to the longitudinal axis of said body member,

a cap sealingly fitted to one end of said body member and bearing an outwardly projecting spout, and

a fluid entry passageway in communication with said spout and with an orifice at the interior surface of said cap, the orifice being positioned over said trough to discharge in the trough fluid supplied to said spout when said drum is in a horizontal position,

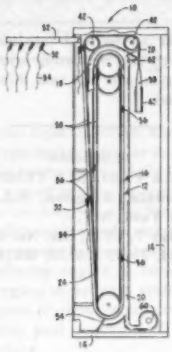
said trough comprising means for holding the fluid received therein isolated from the interior surface of said drum when said trough is positioned to receive fluid from said orifice and also having an open top extending substantially parallel to the longitudinal axis of said body member for dispensing said fluid substantially simultaneously over a side wall of said trough in response to rotation of said drum about its horizontal axis.

4,005,464

APPARATUS AND METHOD FOR PROCESSING PHOTOGRAPHIC FILM

Vivian D. Krehbiel, Wichita, Kans., assignor to Kreonite, Inc., Wichita, Kans.

Filed Oct. 20, 1975, Ser. No. 623,729
Int. Cl.² G03D *3/12*
U.S. Cl. 354—322 **28 Claims**



1. A photographic film processing apparatus comprising:

a sequence of adjacent elongated chambers communicating with each other at their top and bottom portions and each adapted to contain a selected film treating fluid agent;

an infeed port communicating with a first terminal chamber of the sequence and a discharge port communicating with a second terminal chamber;

at least one carrier including a magnetic element carried thereon, said carrier dimensioned to traverse the inner surface of said chambers;

releasable grip means mounted on said carrier for releasably gripping one end of a length of film with the film maintained in a trailing relation to said carrier; and

magnetic belt means disposed adjacent the outer surface of said chambers and magnetically responsive to the magnetic element of said carrier, said belt means operative for guiding said carrier through the elongated lengths of said chambers thereby subjecting the film to a succession of the film treating fluid agents in predetermined order.

4,005,465

TUNNEL EMITTER PHOTOCATHODE

Brian S. Miller, Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Division of Ser. No. 476,248, June 4, 1974, Pat. No. 3,913,218.
This application May 30, 1975, Ser. No. 582,545
Int. Cl.² H01L *49/02, 27/14*
U.S. Cl. 357—6 **5 Claims**

1. A tunnel emitter photocathode comprising:

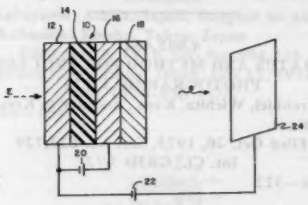
a layer of semiconductor material that converts light to photoelectrons, said semiconductor material having an electrical contact attached thereto;

an amorphous aluminum oxide insulating layer contiguous with one side of said layer of semiconductor material;

a constant thickness metallic emitter layer contiguous with said insulating layer and having an electrical contact attached thereto;

a thin layer of low work function material contiguous with said metallic emitter layer; and

a bias voltage source connected to electrical contacts attached to said semiconductor material and said metallic emitter layer wherein said bias voltage source produces



an electric field across said insulating layer to tunnel electrons through said insulating layer and into said metallic emitter layer and out said thin layer of low work function material.

4,005,466

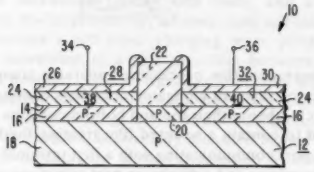
PLANAR VOLTAGE VARIABLE TUNING CAPACITORS

Robert Herman Dawson, Kingston, N.J., assignor to RCA Corporation, New York, N.Y.

Filed May 7, 1975, Ser. No. 575,421

Int. Cl.² H01L *29/92, 29/78;* **H01G** *9/00, 9/18*

U.S. Cl. 357—14 **4 Claims**



1. A planar semiconductor device comprising:

a body of semiconductor material having one type conductivity and having a surface, said body having a first region and a second region therein, said first region being adjacent said surface and having a lower carrier concentration than said second region;

a third region of semiconductor material having said one type conductivity within said first region, said third region being adjacent said surface and extending through said first region to said second region, said third region having a carrier concentration on the order of that of said second region;

a layer of dielectric material overlying said first region;

a first electrode overlying a first portion of said layer of dielectric material; and

a second electrode overlying a second portion of said layer of dielectric material, said second electrode being insulatingly separated from said first electrode, said third region being in the electrical path between said first electrode and said second electrode.

4,005,467

HIGH-POWER FIELD-EFFECT TRANSISTOR AND METHOD OF MAKING SAME

Claude Vergnolle, Paris, France, assignor to Thomson-CSF, Paris, France

Continuation-in-part of Ser. No. 412,785, Nov. 5, 1973, abandoned. This application Aug. 22, 1975, Ser. No. 606,946

Claims priority, application France, Nov. 7, 1972, 72.39347

Int. Cl.² H01L *29/80*

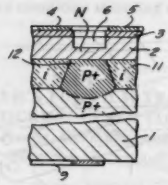
U.S. Cl. 357—22 **9 Claims**

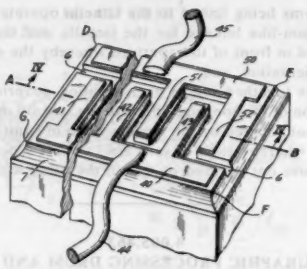
1. A field-effect transistor comprising:

a monocrystalline semiconductive substrate of one conductivity type forming a body with an upper and a lower surface;

a semiconductive layer of opposite conductivity type overlying said upper surface;

a semiconductive film of a resistivity and a thickness substantially less than those of said layer and of said opposite conductivity type disposed on said layer, said layer and film being provided with a trench cutting through said





film and partly into said layer to leave a channel of controllable conductivity, said trench subdividing said layer and film into two semiconductive segments bounded by passivated surface areas;

a pair of metallic deposits respectively overlying said segments and forming a pair of main electrodes separated by said trench; and

a metallic gate electrode on said lower surface in line with said channel.

4,005,468

SEMICONDUCTOR PHOTOELECTRIC DEVICE WITH PLURAL TIN OXIDE HETEROJUNCTIONS AND COMMON ELECTRICAL CONNECTION

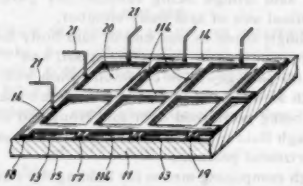
Shigeru Tanimura, Kyoto; Nobuaki Miura, and Mikizo Miyamoto, both of Nagaokakyo, all of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Apr. 3, 1973, Ser. No. 347,427

Claims priority, application Japan, Apr. 4, 1972, 47-34174; Sept. 30, 1972, 47-98248

Int. Cl.² H01L *29/90, 33/00, 31/12, 27/14*

U.S. Cl. 357—15 **42 Claims**



1. A semiconductor photoelectric device of increased light receiving area for providing increased photoelectric output current comprising:

a semiconductor substrate having a main surface,

a plurality of tin oxide films deposited on said main surface of said semiconductor substrate, said tin oxide films being spaced apart from each other by a narrow spacing between peripheral portions of adjacent tin oxide films, whereby a corresponding plurality of heterojunction barriers, each having a rectifying characteristic, is formed between said tin oxide films and said substrate, said narrow spacings between said tin oxide films reducing stresses at the respective barriers thereof,

means comprising a metal layer forming an electrically common connection to the separate tin oxide films, said metal layer being formed to include portions respectively extending along each said spacing and in electrical contact with the peripheral portions of all of said adjacent tin oxide films, thereby permitting incident light to be received by said tin oxide films,

an insulator on said substrate and extending at least within said narrow spacings for maintaining said metal layer in spaced, insulated relationship from said substrate, and

means for withdrawing a photoelectric conversion output from between said semiconductor substrate and said connecting means.

4,005,469

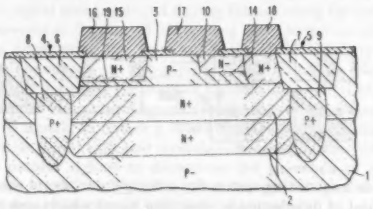
P-TYPE-EPITAXIAL-BASE TRANSISTOR WITH BASE-COLLECTOR SCHOTTKY DIODE CLAMP

Augustine Wei-Chun Chang, Wappingers Falls, and Vincent Joseph Lucarini, Pleasant Valley, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 20, 1975, Ser. No. 588,918

Int. Cl.² H01L *29/48, 29/56, 29/64, 29/72*

U.S. Cl. 357—15 **7 Claims**



1. A Schottky diode clamped transistor comprising:

a heavily doped first layer of a first impurity type forming the collector of said transistor,

a lightly doped second layer of the other conductivity type over said first layer and forming the base of said transistor,

a heavily doped first region of said first conductivity type in the surface of said second layer and forming the emitter of said transistor,

a lightly doped second region of said first conductivity type in said surface of said second layer and separated from said first region,

a heavily doped reach-through region of said first conductivity type extending through said second layer and connecting said second region to said first layer, and

a contacting member on the surface of said second layer and extending across the boundary of said second region to establish ohmic contact with said second layer outside said second region and Schottky barrier contact with said second layer inside said second region.

4,005,470

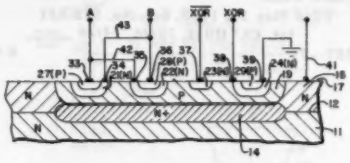
TRIPLE DIFFUSED LOGIC ELEMENTS

Patrick A. Tucci, Santa Clara, and Lewis K. Russell, San Jose, both of Calif., assignors to Signetics Corporation, Sunnyvale, Calif.

Filed July 15, 1974, Ser. No. 488,754

Int. Cl.² H01L *29/72*

U.S. Cl. 357—36 **14 Claims**



1. In a semiconductor logic structure, a semiconductor body of one conductivity type having a planar surface, a sole continuous first region of opposite conductivity type formed in said body and extending to said surface, spaced second, third and fourth regions of one conductivity type formed entirely within said sole continuous first region and extending to said surface, said second and third regions forming base regions, said fourth region forming a collector region in combination with said body and said first region to define a vertical transistor, fifth and sixth emitter regions of opposite conductivity respectively formed entirely within said second and third regions and extending to said surface.

4,005,471

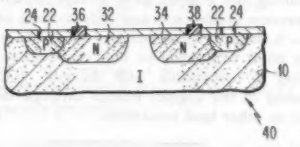
SEMICONDUCTOR RESISTOR HAVING A HIGH VALUE RESISTANCE FOR USE IN AN INTEGRATED CIRCUIT SEMICONDUCTOR DEVICE

Ingrid E. Magdo, and Steven Magdo, both of Hopewell Junction, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 17, 1975, Ser. No. 559,276

Int. Cl.² H01L *27/02, 29/12;* **H01H** *37/38, 37/40*

U.S. Cl. 357—51 **10 Claims**



1. A high value resistor element for use in a semiconductor integrated circuit device comprising:

a semiconductor body

a high resistivity region in said semiconductor body, with a resistivity in excess of one ohm cm. and a first type background impurity;

at least two parallel elongated diffused regions in said high resistivity region of said semiconductor body extending inwardly from the surface, said diffused regions embodying a first type impurity, each having a central surface region with an impurity concentration sufficient to provide an ohmic contact, the boundaries of said surface diffused regions defined by the interface where the impurity concentration of the region is ten percent more than the impurity concentration of said first type background impurity, the impurity concentration in said diffused regions decreasing with distance in a radiating direction from the central surface region,

said diffused regions being spaced such that said boundaries intersect with each other, and

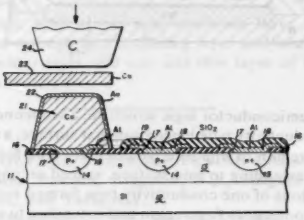
ohmic contact terminals to each of said diffused regions located over said central surface regions.

4,005,472

METHOD FOR GOLD PLATING OF METALLIC LAYERS ON SEMICONDUCTIVE DEVICES

James M. Harris, and William M. Gouin, both of San Jose, Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed May 19, 1975, Ser. No. 578,651
Int. Cl.² H01L *29/46, 23/48*
U.S. Cl. 357—71 **6 Claims**



1. In a method for gold plating of an integrated circuit semiconductive device, of the type which includes a plurality of exposed copper thermal compression gang bonding bumps rising above the passivated surface of the semiconductive device and being connected at their bases to an underlying pattern of interconnect metallization, for providing an antioxidant coating of gold on the exposed copper gang bonding bumps without plating of gold nonmetallic portions of the device, the steps of:

applying as a final plating step an immersion gold plating solution to both the exposed copper gang bonding bumps and nonmetallic surface portions of the semiconductive device for plating out of the immersion gold plating solution by a process of oxidation-reduction reaction using the differences inherent in the electropotentials of the gold and the copper of the gang bonding bumps to be plated as the driving force for selectively plating the gold directly onto the copper gang bonding bumps; and

maintaining the copper gang bumps in contact with the immersion plating solution only so long as to plate gold onto the copper gang bonding bumps to a thickness less than 6000 angstroms so that the thickness of the gold plating is compatible with thermal compression gang bonding of the copper bumps through the gold plating layer to other lead structures.

4,005,473

METHOD AND APPARATUS FOR SYNCHRONIZING RECORD AND PLAYBACK OF VIDEO SIGNALS

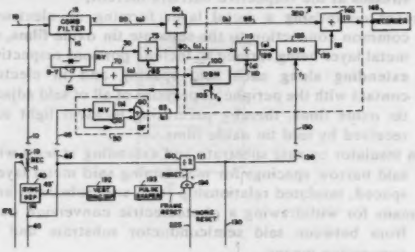
Bernhard A. Hjortzberg, Mission Viejo, Calif., assignor to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Apr. 25, 1975, Ser. No. 571,705
Int. Cl.² H04N *9/46, 5/76*
U.S. Cl. 358—4 **13 Claims**

1. In a color video signal processing system which includes separating and demodulating said color video signal into its component signals of luminance information and chrominance information; producing from said component signals an encoded signal having a bandwidth of not more than approximately 3MHz, such that one half of the sum of two successive horizontal scan lines of information equals the luminance information of the color video signal and one half of the difference of two successive horizontal scan lines of information equals the chrominance information of the color video signal, said chrominance information being represented by a first chrominance signal and a second chrominance signal which are contained in two non-overlapping frequency regions; and recombining the processed luminance and chrominance signals prior to transmitting or recording of the encoded signal, a synchronizing arrangement comprising the steps of:

separating the horizontal sync signal from the color video signal;

generating an indicating signal under the control of the separated horizontal sync signal;



combining said indicating signal with each of said luminance and chrominance signals, and

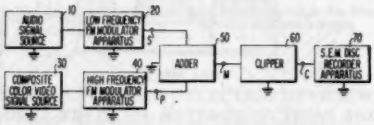
prior to said recombining of the processed luminance and chrominance signals, amplitude modulating at least one of the chrominance signals as combined with said indicating signal.

4,005,474

RECORDING APPARATUS AND METHODS FOR A COLOR PICTURE/SOUND RECORD

Eugene Orville Keizer, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Division of Ser. No. 531,138, Dec. 9, 1974, Pat. No. 3,972,064, which is a division of Ser. No. 441,069, Feb. 11, 1974, Pat. No. 3,911,476. This application Dec. 24, 1975, Ser. No. 644,156
Claims priority, application United Kingdom, Mar. 20, 1973, 13234/73
Int. Cl.² H04N *9/02*
U.S. Cl. 358—4 **3 Claims**



3. In a recording system for color picture/sound records, the method of developing a recording signal which comprises the steps of:

a. developing (1) a composite color video signal representative of color images to be recorded and including the combination of a luminance signal component occupying a given band of frequencies, and a chrominance signal component comprising a modulated color subcarrier, the sidebands of which extend over a midband portion of said given band of frequencies, and (2) an audio signal representative of a sound accompaniment for the color images to be recorded;

b. modulating the frequency of a first carrier over a relatively low frequency deviation range, below and spaced from said midband portion of said given band of frequencies, in accordance with said audio signal, while modulating the frequency of a second carrier over a relatively high frequency deviation range, above and spaced from said given band of frequencies, in accordance with said composite color video signal;

c. combining the first frequency modulated carrier with the second frequency modulated carrier to form a combination signal; and

d. doubly clipping said combination signal to form a recording signal comprising an impulse train having a repetition rate which varies in accordance with said composite color video signal, and having a duty cycle which varies at a frequency indicative of the amplitude of said audio signal.

4,005,475

METHOD FOR IMPROVING SHARPNESS WHEN RECORDING HALF-TONE PICTURES BY MODULATING A SHARPNESS SIGNAL

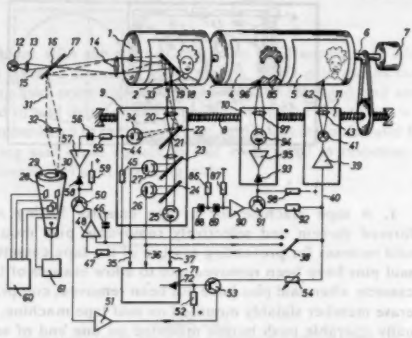
Hans-Georg Knop, Ascheberg, Germany, assignor to Dr. -Ing. Rudolf Hell GmbH, Kiel, Germany

Division of Ser. No. 365,486, May 31, 1973. This application Feb. 12, 1975, Ser. No. 549,485

Claims priority, application Germany, June 2, 1972, 2226990

Int. Cl.² G03F *3/08*

U.S. Cl. 358—80 **1 Claim**



1. In a method of recording half-tone pictures in which picture patterns are opto/electrically scanned to produce picture signals and the picture signals are superimposed for increasing sharpness during the recording process with a sharpness signal also produced during the scanning operation, the improvement therein of increasing the sharpness of the recording comprising the steps of: generating the sharpness signal in dependence on the picture contents of the picture pattern; superimposing the picture content dependent sharpness signal and the picture signals during recording; evaluating the picture signals to obtain a modulation signal; modulating the sharpness signal with said modulation signal; further evaluating the picture signals to determine the presence of a selected color signal; and blocking the sharpness signal in response to detection of said selected color signal.

4,005,476

CIRCUIT FOR COMPENSATING TIME ERRORS IN A TELEVISION SIGNAL, PARTICULARLY FROM A RECORDING INSTRUMENT

Gerhard Dickopp, Berlin; Lothar Oertel, Ulm(Danube), and Wolfgang Frey, Heilbronn, all of Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

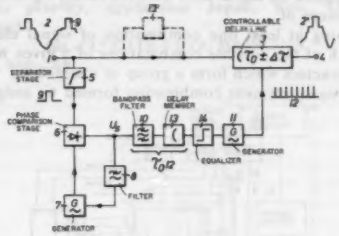
Filed Dec. 5, 1974, Ser. No. 530,145

Claims priority, application Germany, Dec. 11, 1973, 2361562

Int. Cl.² H04N *5/795, 5/04*

U.S. Cl. 360—36 **4 Claims**

1. In a circuit for compensating time errors in a television signal, including means defining a first conducting path connected to conduct the television signal, means defining a second conducting path, a delay line presenting electronically controllable delay time connected in the first conducting path, and signal generating means connected in the second conducting path for producing a control signal to vary the delay time of the delay line from a basic delay time value Y_o by an amount $\pm\Delta Y$, the improvement comprising delay means connected in at least one of said conducting paths, said delay



means producing a signal time delay which causes the delay time effective in said second path to be one-half the basic delay time Y_o, thereby to provide a more accurate compensation with respect to time errors which vary at higher rates.

4,005,477

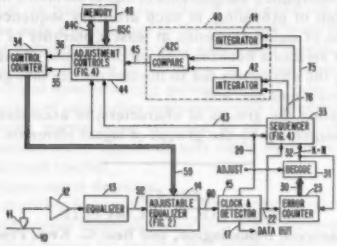
PHASE EQUALIZED READBACK APPARATUS AND METHODS

Hjalmar Holmboe Ottesen, Oslo, Norway, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 24, 1975, Ser. No. 634,800

Int. Cl.² G11B *5/02, 5/09*

U.S. Cl. 360—51 **14 Claims**



1. The method of operating a magnetic signal recorder supplying a readback signal having predetermined desired phase and frequency properties,

the steps of:

establishing a reference signal indicative of said predetermined properties;

comparing said reference signal and said readback signal and indicating deviations in said readback signal from said desired properties; and

phase adjusting said readback signal in accordance with said indication.

4,005,478

PROCESS AND ARRANGEMENT FOR REPRESENTING DIGITAL DATA BY BINARY SIGNALS

Manfred Beinhauer, Wolfratshausen, and Eckhart Scharkowitz, Krailling, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed July 23, 1975, Ser. No. 598,277

Claims priority, application Germany, Sept. 16, 1974, 2444218

Int. Cl.² G11B *5/00*

U.S. Cl. 360—40 **10 Claims**

1. A process for representing digital data by binary signals, in which the data are in the form of binary, ternary or higher

value coded characters, in which the characters are fed in the form of data signals to a transmitter which assigns binary signals to the characters, and in which the binary signals are transmitted over a transmission channel to a data receiver which regains the digital data from the binary signals, comprising the steps of:

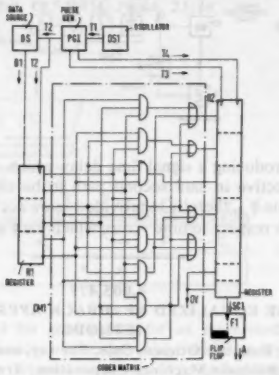
assigning at least one combination of signal elements to each of the possible combinations of a given number of characters which form a group of characters;

each signal element combination formed by assigning first signal elements to represent a first or a second amplitude value and assigning second signal elements to represent a change in the amplitude value;

the last-mentioned assignments of signal elements including the step of providing, in each arbitrary sequence of the groups of signal elements, at least a plurality of the first signal elements between two second signal elements;

dividing the characters fed to the transmitter into groups of the given number; and

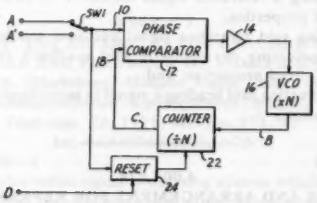
representing the groups of characters, in accordance with the assignment by the groups of signal elements.



4,005,479
PHASE LOCKED CIRCUITS

Roger Hunnicutt, Bloomington, and Beat G. Keel, Prior Lake, both of Minn., assignors to Control Data Corporation, Minneapolis, Minn.

Filed Jan. 16, 1976, Ser. No. 649,953
Int. Cl.² G11B 5/09
U.S. Cl. 360—51 **8 Claims**

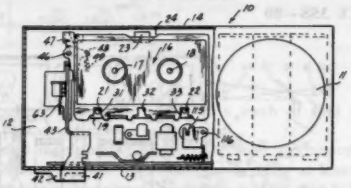


1. In a phase lock circuit having a phase comparator having a first input for receiving one of a plurality of signals each having the same frequency but whose phase may be different in relationship to each other, the improvement comprising: multiplier means connected to the output of said phase comparator for multiplying the frequency of the signal appearing at said first input by N, where N is a predetermined amount; resettable divide means connected to said multiplier means for dividing the multiplied signal from said multiplier means by N; reset means for resetting said divide means upon a change of selection of input signals to said first input of said phase comparator, whereby upon change of selection of input signals to said first input of said phase comparator, said divide means provides pulse signals at a frequency equal to said input signal and at a phase which differs from the phase of said input signal by an amount no greater than π/N radians; and means connecting the output of said divide means to a second input of said phase comparator.

4,005,480
TAPE CASSETTE AND MACHINE

Isao Matsumoto, and Kenkichi Umeda, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Feb. 3, 1975, Ser. No. 546,334
Int. Cl.² G11B 15/04; G06K 7/08
U.S. Cl. 360—60 **3 Claims**



1. A tape machine for a tape cassette having recesses formed therein and selectively removable pins mounted in said recesses for preventing erasure of the tape cassette when said pins have been removed and to allow erasure of the tape cassette when said pins have not been removed, comprising an erase member slidably mounted on said tape machine, a manually operable push button mounted on one end of said slidable erase member, a pawl pivotally mounted on said tape machine and having a cassette engaging portion formed thereon and said pawl spring biased such that said cassette engaging portion is biased toward one of said pins and movable into one of said recesses, a notch formed in said pawl and said slidable erase member engageable with said pawl such that if one of said removable pins has been removed said slidable erase member engages said notch in said pawl to prevent substantial movement of said erase member and prevent erasure, and an erase enable switch directly engageable with said slidable erase member such that said slidable erase member actuates said switch when said erase enable switch is moved when said one of said pins has not been removed.

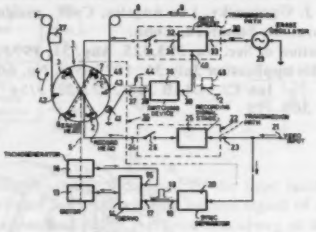
4,005,481
RECORDING AND/OR PLAYBACK APPARATUS WHICH PREVENTS ERASURE OF THE SYNCHRONIZATION TRACK

Robert Lackner, Vienna, Austria, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 426,256, Dec. 19, 1973, abandoned.
This application July 15, 1975, Ser. No. 596,204
Claims priority, application Austria, Jan. 29, 1973, 743/73
Int. Cl.² G11B 15/04
U.S. Cl. 360—60 **3 Claims**

1. A recording and/or playback apparatus for video signals of the type wherein a rotary head system transversely scans the entire width of a record carrier in a plurality of parallel tracks, the rotary head system comprising a recording head and/or playback head and an erase head for transversely erasing a recorded video signal, the improvement wherein the apparatus further comprises an additional stationary recording and/or playback head longitudinally scanning the record carrier along an additional track that crosses the path of the transversely recorded tracks, means for phase locking field synchronization pulses of said video signal to the angular position of said rotary head, said erase head being angularly

displaced with respect to said recording head whereby the erase head initiates the scan of a first track on said carrier a predetermined first delay time after the recording head initiates the scan of a further track, terminal means for receiving timing pulses synchronized with the angular position of said rotary head system, delay means connected to said terminal means for converting said timing pulses into a blanking pulse



coincident with the scan of the erase head across said additional track, a source of erase signals, AND-gate means connecting said erase signal source to said erase head and connected to said delay means for conducting said erase signals to said erase head in the absence of said blanking pulse and for blocking said erase signals to said erase head in response to the presence of said blanking pulse.

4,005,482

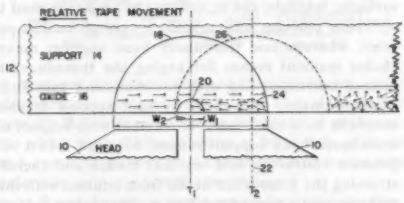
ASYMMETRIC ERASE ACROSS A ROTARY TRANSFORMER TO A ROTATING MAGNETIC HEAD

Fernando Castro, Longmont, and Richard Lewis O'Day, Boulder, both of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 6, 1975, Ser. No. 584,546

Int. Cl.² G11B *5/02*

U.S. Cl. 360—66 **10 Claims**



1. In a magnetic storage system, having a magnetic storage medium and a magnetic head for erasing the storage medium, and wherein there is relative motion between the magnetic head and the magnetic storage medium, improved apparatus for D.C. erasing the magnetic storage medium with a cyclic waveform comprising:

means electrically connected to said magnetic head for converting a time asymmetric cyclic waveform into an amplitude and time asymmetric cyclic waveform and applying said time and amplitude asymmetric waveform to said magnetic head;

means electrically connected to said conversion means for driving said conversion means with a time asymmetric waveform whereby said head through said conversion means is driven with a time and amplitude asymmetric waveform to perform the equivalent of a D.C. erase on the magnetic storage medium as the medium moves relative to said magnetic head.

4,005,483

AUTOMATIC RECORD CONTROL APPARATUS WITH MULTICHANNEL MEMORY

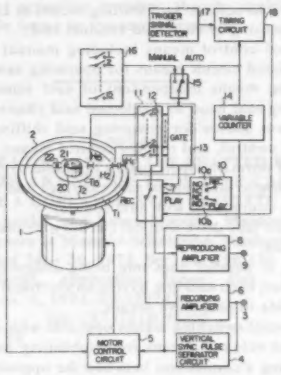
Takeshi Kuwano, Mito, Japan, assignor to Hitachi, Ltd., Japan

Filed Nov. 15, 1974, Ser. No. 524,273

Claims priority, application Japan, Nov. 19, 1973, 48-129963

Int. Cl.² G11B *15/14;* **H04N** *5/78*

U.S. Cl. 360—69 **7 Claims**



1. An automatic record control apparatus for a multichannel memory comprising:

a magnetic recording medium having multichannel tracks;

first means for recording video signals in said multichannel tracks one-track by one-track endlessly in such a manner that the track to be recorded is changed from one track to the next and returned to the first track from the last track for sequentially recording said video signals in a track-by-track fashion in response to pulses associated with vertical synchronizing pulses for said video signals, the period of said pulses associated with the vertical synchronizing pulses being selected so as to record all of the desired video signals of said video signals in said multichannel tracks;

a trigger signal detector;

an amplifier for amplifying said trigger signal detected by said trigger signal detector into a predetermined level; a gating device for passing said pulses associated with said vertical synchronizing signal from the instant of detecting said trigger signal;

a counter circuit for counting a predetermined even number of said pulses associated with said vertical synchronizing pulses, said counter circuit producing a first potential indicative of half of said even number when said half of said even number is reached, said counter circuit producing a second potential indicative of said predetermined even number when said predetermined even number is reached, said second potential being different from said first potential; and a control circuit including a resistor and a capacitor, said capacitor being charged with said first potential when said first potential is produced, said capacitor being discharged through said resistor when said second potential is produced, the recording in said multichannel being stopped at time of said discharge.

4,005,484

AUTOMATIC STOPPER FOR MULTITRACK RECORDER

Tadashi Fujita, Ishikawa, Japan, assignor to Electromechanics Research, Durham, N.C.

Filed May 28, 1975, Ser. No. 581,678

Int. Cl.² G11B *15/02*

U.S. Cl. 360—74 **4 Claims**

1. In a cartridge type player-recorder using a multi-track

forming multi-channel endless tape with detectable channel ends and having:

a. a magnetic tape head operatively associated with said tape at a position adjacent thereto;

b. shifting means for shifting said head from channel to channel;

c. drive means for driving said tape past said head;

d. automatic control means including means for sensing the end of each respective channel on said tape during movement thereof and actuator means operative in response thereto to actuate said shifting means in correspondence with sensing of each said channel end;

e. manual control means including manual switching and associated circuit means for operating said actuator and shifting means independent of said sensing means for shifting said head to a selected said channel;

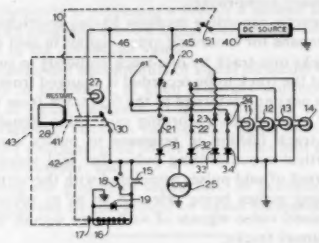
f. a power source for powering said shifting, drive, automatic control, and manual control means; and

g. a first normally-open switch operable to being closed in response to insertion of said cartridge and being placed in series connection with said source;

an improved tape drive shut-off circuitry means comprising, in combination:

h. a set of parallel lines one being assigned for each said channel, each said line having an electrical connection on one side to said drive means;

i. sequential switching means operable with each operation of said actuator means for establishing and sequentially stepping a connection between the opposite side of each



said line and said source through said first switch and in sequential correspondence with said head shifting from channel to channel;

j. a plurality of normally-closed manual channel stop selector switches each being in series with one of said lines, said selector switches being adapted for operating either all closed or one open enabling a selected one of such lines to be open circuited to prevent the playing of the channel corresponding thereto by opening the respective manual switch connected therein; and

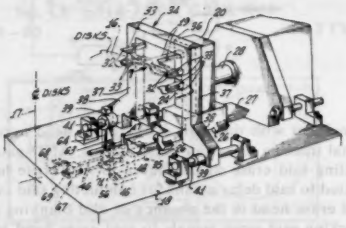
k. an auxiliary switch connected on one side to said source through said first switch and on the opposite side to said drive means and operable for being closed in response to insertion of said cartridge and for being opened in response to withdrawal of said cartridge and independently to being opened in response to each operation of said actuator means without disturbing the inserted position of said cartridge thereby providing an auxiliary path for energizing said drive means from said source when said auxiliary switch is closed, one of said selector switches is open and said sequential switching means has stepped to the line connection having said open selector switch therein, whereby said player-recorder may be operated in a continuous mode by leaving all said selector swtiches closed and said cartridge depressed or in a mode in which said player-recorder is stopped at the end of a selected channel by opening the said selector switch in the line corresponding to the channel next following the last channel desired to be played and allowing said player-recorder to operate until said sequential switching means steps to the line connection having such open selector switch.

4,005,485

APPARATUS AND METHOD FOR LOADING AND UNLOADING TRANSDUCER HEADS

Willard J. Opocensky, Los Angeles, Calif., assignor to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 393,325, Aug. 31, 1973, abandoned.
This application July 31, 1975, Ser. No. 600,695
Int. Cl.² G11B *21/12, 21/22, 5/54*
U.S. Cl. 360—75 **16 Claims**



1. Apparatus for moving transducer heads into an operative position adjacent the surfaces of rotatable disks in a disk storage device, said apparatus comprising:

transducer head support means for supporting the transducer heads for movement across disk surfaces;

means for moving said transducer head support means parallel to the disk surfaces;

first mechanical means for moving the transducer heads in a direction toward and substantially perpendicular to the disk surfaces; and

second mechanical means adapted for movement radially inward and contacting said transducer head support means and said first mechanical means, and operative to then move in a reverse radial direction so as to automatically actuate said first mechanical means as said transducer head support means is moved radially inward through a preselected position with respect to the disk surfaces, whereby the transducer heads are moved to the operative position substantially inward of the disk peripheries, wherein said transducer head support means includes resilient means for urging the transducer heads toward corresponding disk surfaces; and said first mechanical means is moved by said second mechanical means in its inward radial movement with respect to said transducer head support means, between a first relative position restraning said resilient means and thereby restraining the transducer heads from contact with the disk surfaces and a second relative position when said second mechanical means begins its reverse radial movement allowing the heads to be uged into the operative position.

4,005,486

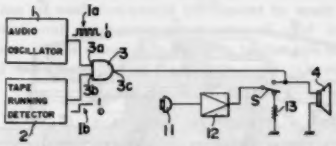
APPARATUS FOR DETECTING TAPE RUNNING IN A TAPE RECORDER

Ken Satoh, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed May 28, 1975, Ser. No. 581,624
Claims priority, application Japan, June 3, 1974, 49-64264[U]; June 3, 1974, 49-64265[U]
Int. Cl.² G11B *15/06, 23/30, 31/00*
U.S. Cl. 360—79 **3 Claims**

1. An apparatus for detecting tape running in a tape recorder comprised of a pair of reels and a tape having at least its opposite ends connected to respective ones of said reels; a battery and tape driving means for driving said tape including

motor means being connectible to said battery for operating the driving means; the terminal end portions of the tape being different from the portion of the tape provided for recording signals; said detector means comprising means for producing an audio signal of a fixed frequency when connected to said battery, a tape running detector means for producing an output signal when it has detected the passage of a terminal end



portion of the magnetic tape used in the tape recorder, an AND gate circuit for producing an output signal of an audio frequency corresponding to the fixed frequency of the audio signal producing means responsive to an output signal from the detector and a signal from the generator, and a loudspeaker contained within the tape recorder, the output signal from the AND circuit being applied to the loudspeaker for developing an audible alarm indicative of a tape end.

4,005,487

TAPE-OPERATING APPARATUS ADAPTED FOR USE EITHER WITH AN ENDLESS LOOP TYPE CARTRIDGE OR A COPLANAR TYPE CASSETTE

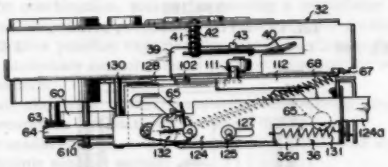
Satosi Asai, Annaka, and Isamu Matsuki, Maebashi, both of Japan, assignors to Matsuki-Seisakusho, Maebashi, Japan

Filed June 26, 1975, Ser. No. 590,477

Claims priority, application Japan, Oct. 31, 1974, 49-125766

Int. Cl.² G11B *15/00, 21/00*

U.S. Cl. 360—94 **3 Claims**



1. A magnetic tape recording and/or reproducing apparatus for selectively operating an endless type cartridge which has a substantially flat surface on the underside or a coplanar type cassette which has a thicker portion at the middle of its underside and a pair of thinner portions at the lengthwise sides of the underside, said apparatus comprising:

a main frame having a single space for receiving the cartridge or the cassette and a bottom plate defining the bottom of the space, said bottom plate having a pair of raised portions on both lengthwise sides for guiding the underside of the cartridge or the thinner portions of the cassette inserted in the space and a depressed portion defined between the raised portions for receiving the thicker portion of the cassette;

a movable frame fitted with a cassette-tape operating means including:

a magnetic head;

means mounting the movable frame on the main frame for movement between a first position where the cassette-tape operating means is within said space and in operative position with a cassette inserted in said space and a second position wherein the cassette-tape operating means is out of said space;

spring means urging the movable frame to the second position; and,

actuating means for shifting the movable frame to the first position against the spring means in response to the insertion of a cassette into the space, said actuating means including a first actuating member movably mounted on the depressed portion of the bottom plate and having a height not beyond the upper surfaces of the raised portions so that the first actuating member is moved by the thicker portion of the inserted cassette, thereby shifting the movable frame to the first position, but allows the free passage of the inserted cassette over the first actuating member, thereby maintaining the movable frame in the second position.

4,005,488

TAPE-OPERATING APPARATUS ADAPTED FOR USE EITHER WITH AN ENDLESS LOOP TYPE CARTRIDGE OR A COPLANAR TYPE CASSETTE

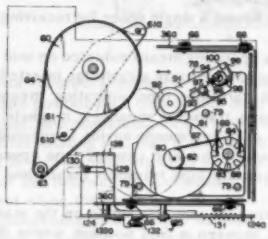
Satosi Asai, Annaka, and Isamu Matsuki, Maebashi, both of Japan, assignors to Matsuki-Seisakusho, Maebashi, Japan

Filed June 26, 1975, Ser. No. 590,476

Claims priority, application Japan, Oct. 31, 1974, 49-125768; Nov. 6, 1974, 49-127742

Int. Cl.² G11B *15/00*

U.S. Cl. 360—94 **7 Claims**



1. A magnetic tape recording and/or reproducing apparatus for selectively operating an endless type cartridge or coplanar type cassette, comprising:

a main frame having a single space for receiving a cartridge or cassette;

a cartridge operating means including cartridge tape transport means fixed to said main frame positioned to operate a cartridge inserted within said space;

a movable frame fitted with cassette operating means including cassette tape transport means having a first capstan and a pinch roller;

means mounting said movable frame on said main frame;

means guiding said movable frame for movement between a first position where the cassette tape operating means is in said space and in operative position with a cassette inserted in said space and a second position where the cassette tape operating means is out of said space;

a first spring means normally urging said movable frame to said second position;

actuating means for shifting said movable frame to said first position against said first spring means responsive to the insertion of a cassette into said space; and, said cassette transport means further including:

a motor mounted on said main frame;

a first wheel mounted on said main frame and driven by said motor;

a second wheel mounted on said movable frame and operatively coupled to said first capstan;

an idling wheel mounted on said movable whereby said first wheel and said second wheel are operatively coupled together when said movable frame is brought to said first position.

4,005,489

TAPE-OPERATING APPARATUS ADAPTED FOR USE EITHER WITH AN ENDLESS LOOP TYPE OR A COPLANAR TYPE CASSETTE

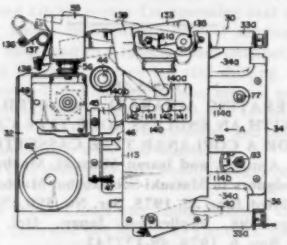
Satosi Asai, Annaka, and Isamu Matsuki, Maebashi, both of Japan, assignors to Matsuki-Seisakusho, Maebashi, Japan

Filed June 26, 1975, Ser. No. 590,474

Claims priority, application Japan, Oct. 31, 1974, 49-125766

Int. Cl.² G11B *15/00, 21/00*

U.S. Cl. 360—94 **5 Claims**



1. A magnetic tape recording and/or reproducing apparatus for selectively operating an endless type cartridge or coplanar type cassette, comprising:

a main frame having a single space for receiving a cartridge or cassette:

cartridge tape operating means mounted on said main frame and positioned to operate a cartridge inserted within said space, said cartridge tape operating means including cartridge tape transport means, a magnetic head, and head track changing means having a solenoid;

a movable frame fitted with cassette-tape operating means including cassette tape transport means and a magnetic head;

means mounting the movable frame on the main frame for movement between a first position where the cassette-tape operating means is in said space and in operative position with a cassette therein and a second position where the cassett-tape operating means out of said space;

spring means urging the movable frame to the second position;

actuating means for shifting the movable frame to the first position against the urging of the spring means responsive to the insertion of a cassette into the space;

locking means for keeping the movable frame in the first position when the movable frame is shifted to the first position by the actuating means;

releasing means connected to the solenoid to release the locking means and allow the movable frame to be urged back to the first position responsive to the solenoid being energized; and

an electric circuit means for energizing the solenoid.

4,005,490

MAGNETIC DISC MEMORY

Damon H. Duncan; Craig T. Herdman, and Terrance V. Littlejohn, all of Phoenix, Ariz., assignors to Sperry Rand Corporation, New York, N.Y.

Filed May 15, 1975, Ser. No. 577,970

Int. Cl.² G11B *5/60, 25/04, 21/20*

U.S. Cl. 360—97 **9 Claims**

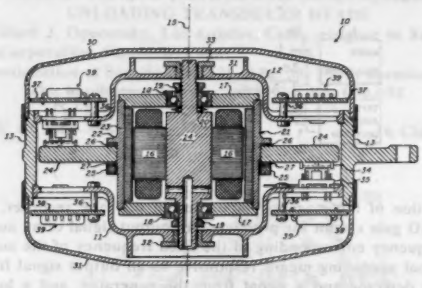
1. A magnetic disc memory comprising:

a symmetrical housing including a generally cylindrical-shaped frame and a pair of members bridging the ends of the cylindrical-shaped frame;

central support means, secured between said bridging members, and disposed to substantially coincide with the axis of symmetry of said housing;

motor means including a stator affixed to said central support means and a rotor surrounding said stator and journalled for rotation about said central support means;

disc means secured to and disposed in circumferential relationship to the outer periphery of said rotor and extending radially outward therefrom;



both annular surfaces of said disc means being magnetizable; and

at least one read/write head assembly mounted on each bridging member and extending toward a respective magnetizable surface of said disc means.

4,005,491

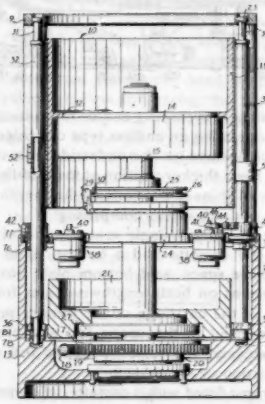
DAMPENED TRANSDUCER SUPPORT APPARATUS FOR MESSAGE ANNOUNCING SYSTEM

Walter P. Walker, Atlanta; Leary W. Smith, Chamblee; Frank H. Cofer, Jr., and Jack E. Lewis, both of Atlanta, all of Ga., assignors to The Audichron Company, Atlanta, Ga.

Division of Ser. No. 396,155, Sept. 11, 1973, Pat. No. 3,886,590, which is a continuation of Ser. No. 140,195, May 4, 1971, abandoned. This application May 23, 1975, Ser. No. 580,301

Int. Cl.² G11B *5/55, 5/76, 21/22*

U.S. Cl. 360—105 **2 Claims**



1. A message announcing apparatus comprising:

a recording medium having a vertical surface and a message path on said vertical surface;

transducer support means mounted for selective upward and downward movement along a predetermined path with respect to said vertical surface;

means selectably operative to move said transducer support means for controlled movement upwardly along said predetermined path so that said transducer support

means traverses said message path, or to release said transducer support means for downward movement by gravity along said predetermined path;

a quantity of oil disposed beneath said recording medium; and

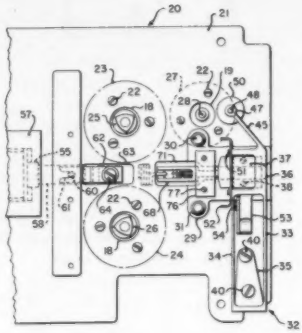
means connected to said transducer support means for said upward and downward movement therewith and extending downwardly into said quantity of oil for at least a portion of said downward movement to resist the free gravitational downward movement of said transducer support means when released, so as to dampen said downward movement of said transducer support means.

4,005,492

TRANSDUCER HEAD POSITIONING APPARATUS

Frank H. Kaufholz, Jr., Havertown, Pa., assignor to Computer Peripherals, Inc., Rochester, Mich.

Filed Aug. 21, 1975, Ser. No. 606,636
Int. Cl.² G11B 5/54, 21/22
U.S. Cl. 360—105 **25 Claims**



1. In combination, means for moving a transducer head from an inoperative position away from a record medium to an operative position engaging the record medium including

a. a stationary support means position adjacent the record medium;

b. an elongated flexible support means having one end secured to said stationary support means;

c. transducer head means secured to the free end of said flexible support means;

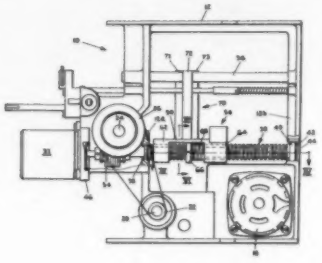
d. and actuating means engaging the free end of said flexible support means to move the free end of the flexible support means in a direction perpendicular to the record medium when operated whereby the flexible support means will flex in a direction to move the transducer head means in a direction perpendicular to the record medium to a position engaging the record medium.

4,005,493

METHOD AND MEANS FOR MOVING RECORDING HEADS IN DISC-TYPE RECORDERS

Samuel A. Morgan, Ann Arbor, Mich., assignor to Sycor, Inc., Ann Arbor, Mich.

Filed Feb. 25, 1975, Ser. No. 552,854
Int. Cl.² G11B 17/00, 5/54, 21/08
U.S. Cl. 360—106 **22 Claims**



1. In a data recorder/reproducer apparatus having means for moving and positioning a transducing head with respect to a magnetic disc, said positioning means including a lead screw, drive means for rotating said lead screw, and a follower member coupled to said transducing head to move the latter upon movement of the follower and connected to said lead screw for movement along the same upon rotation thereof, the improvement comprising; said follower including a first member having at least a portion threadably received on said lead screw; a second member threadably received on said lead screw; biasing means between said first and second members for applying a force to said members acting generally axially of said lead screw and urging said first and second members into frictional engagement with said lead screw of a magnitude sufficient to constitute a friction brake, for securely holding said follower and said lead screw in fixed relative position and precluding undesired movement therebetween from causes other than powered actuation of said drive means.

DESIGN PATENTS

GRANTED JANUARY 25, 1977

ERRATA

For CLASS	See PATENT NO.
001–166	243,201
015–029	243,207

DESIGN PATENTS

GRANTED JANUARY 25, 1977

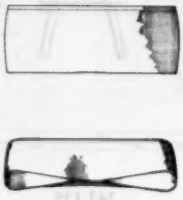
ERRATA

For	See
CLASS	PATENT NO.
001–166	247,201
015–029	243,207

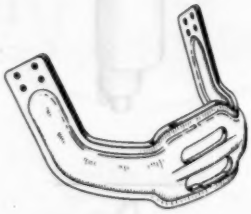
DESIGNS

JANUARY 25, 1977

243,126
BRIEFS
Jack Basseches, Guanabara, Brazil, assignor to I.C.M. Industria e Comercio de Malhas Ltda., Rio de Janeiro, Brazil
Filed Nov. 27, 1974, Ser. No. 527,753
Term of patent 14 years
Int. Cl. D2—*01*
U.S. Cl. D2—1



243,127
MOUTH GUARD FOR A SPORTS HELMET
Charles R. Farquharson, Toronto, Canada, assignor to Canadian Cycle & Motor Company Limited, Weston, Canada
Filed Apr. 7, 1975, Ser. No. 565,503
Claims priority, application Canada, Oct. 7, 1974, 710743
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—233

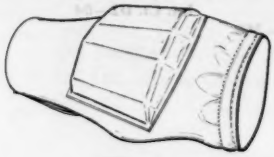


243,128
FACE GUARD FOR A HELMET
Clyde R. Morgan, Boring, Oreg., assignor to Wheelsport Distributing Co.
Filed Oct. 14, 1975, Ser. No. 622,420
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—233

243,129
SHRINERS FEZ STABILIZER
Steve Skapura Sheldon, 18 Steiner Blvd., Barboursville, W. Va. 25504
Filed May 16, 1974, Ser. No. 470,291
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—260

243,130
ORNAMENTAL DESIGN FOR A BOOT
Guy de Massacre, 124 Avenue des Champs-Elysees, Paris (Seine), France
Filed Aug. 26, 1975, Ser. No. 607,871
Claims priority, application France, Feb. 28, 1975, 75.37974
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—272

243,131
WEIGHTED BOWLING GLOVE
Lewis H. Wester, 6030 Sherry Lane, Dallas, Tex. 75225
Filed Apr. 28, 1975, Ser. No. 571,958
Term of patent 14 years
Int. Cl. D2—*06*
U.S. Cl. D2—361



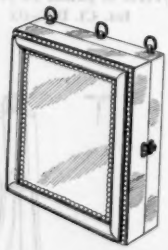
243,132
BASEBALL GLOVE INSERT
Cedric W. Lowrey, 4506 Wellington, Alexandria, La. 71301
Filed July 9, 1975, Ser. No. 594,388
Term of patent 14 years
Int. Cl. D2—*06*
U.S. Cl. D2—361

243,133
BASEBALL GLOVE PAD
Cedric W. Lowrey, 4506 Wellington, Alexandria, La. 71301
Filed July 9, 1975, Ser. No. 594,389
Term of patent 14 years
Int. Cl. D2—*06*
U.S. Cl. D2—361

243,134
CHAIR
James A. Downey, 133 Tiller, Midwest City, Okla. 73110
Filed Sept. 2, 1975, Ser. No. 609,177
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—12

243,135
LIQUID DISPENSER
William E. Moritz, Pittsburgh, Pa., assignor to Victor G. Mollison, Sr., Donora, Pa.
Filed June 25, 1975, Ser. No. 590,280
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D6—95

243,136
JEWELRY CABINET
Carolyn Blanche Foster, 2700 E. Valley Parkway, Space 266, Escondido, Calif. 92027
Filed June 11, 1975, Ser. No. 586,042
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—127

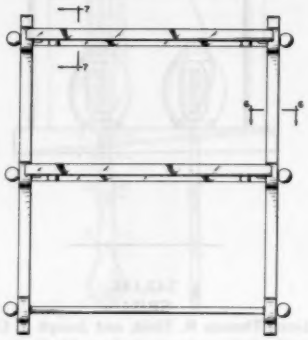


243,137

COMBINED SHELVES AND TOWEL RACK

Jerry A. Brown, 4014 San Jose Drive, Greenwood, Ind. 46142

Filed Feb. 9, 1976, Ser. No. 656,132
Term of patent 14 years
Int. Cl. D6—*04*; D23—*02*
U.S. Cl. D6—136

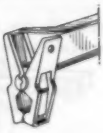


243,138

GARMENT HANGER

Herb Coon, New York, N.Y., assignor to Red Wing Products, Inc., New Hyde Park, N.Y.

Filed Dec. 11, 1975, Ser. No. 639,702
Term of patent 14 years
Int. Cl. D6—*08*
U.S. Cl. D6—253



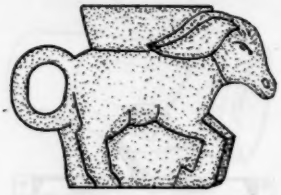
243,139

SERVING TRAY

Adeline M. Nicholas, 8746 Bamarcia Drive, Elk Grove, Calif. 95624

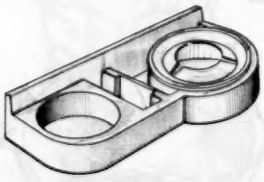
Filed June 4, 1975, Ser. No. 583,567
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D7—21

243,140
MUG
Joniece Frank, Sapulpa, Okla., assignor to Frankoma Pottery, Inc., Sapulpa, Okla.
Filed Aug. 13, 1975, Ser. No. 605,739
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—5

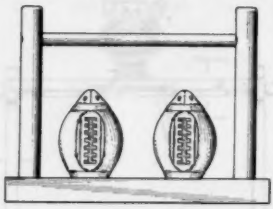


243,141
COFFEE MAKER
Jean Mantelet, Paris, France, assignor to Moulinex, Societe Anonyme, Bagnolet, France
Filed June 23, 1975, Ser. No. 589,063
Claims priority, application France, Jan. 6, 1975, 73.484
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—41

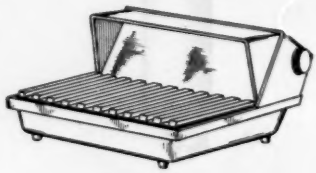
243,142
COMBINED COASTER AND ASH TRAY
John F. Chmela, 1106 Beechwood Drive, Mount Prospect, Ill. 60056
Filed Apr. 24, 1975, Ser. No. 571,282
Term of patent 14 years
Int. Cl. D7—*06*; D27—*03*
U.S. Cl. D7—45



243,143
COMBINED CONDIMENT SHAKER SET AND TRAY THEREFOR
John P. Menzo, 2644 Daffodil St. NE., Canton, Ohio 44705
Filed Dec. 24, 1975, Ser. No. 644,415
Term of patent 14 years
Int. Cl. D7—*06*
U.S. Cl. D7—55

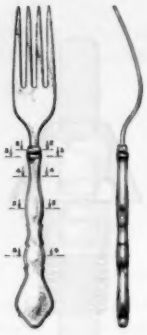


243,144
GRILL
Louis J. Jenn; Thomas R. Field, and Joseph J. Cerola, all of Indianapolis, Ind., assignors to Jenn-Air Corporation, Indianapolis, Ind.
Filed June 23, 1975, Ser. No. 589,035
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D7—110



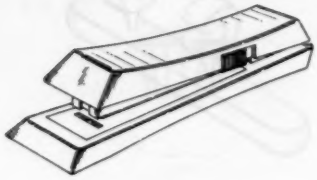
243,145
COMBINED WATER RESERVOIR AND HOLDER FOR POTTED FLOWERS AND PLANTS
Albert E. Zipser, P.O. Box 778, Ceres, Calif. 95307
Filed Dec. 8, 1975, Ser. No. 638,441
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—113

243,146
ARTICLE OF FLATWARE
Robert J. King, Wallingford, Conn., assignor to International Silver Company, Meriden, Conn.
Filed Apr. 25, 1975, Ser. No. 571,715
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137

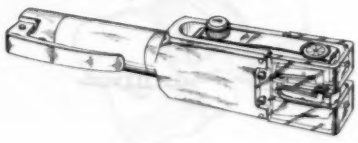


243,147
SOLDERING IRON
Joseph A. Sylvester, San Dimas, Calif., assignor to Solder Removal Co., Covina, Calif.
Filed Nov. 7, 1975, Ser. No. 629,721
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—30

243,148
DESK STAPLER
Monte L. Levin, New York, N.Y., assignor to Swingline, Inc., Long Island, N.Y.
Filed Sept. 12, 1973, Ser. No. 396,377
Disclosure was also published under second Trial Voluntary Protest Program on Apr. 6, 1976
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D8—50

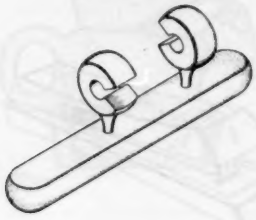


243,149
WIRE STRIPPING TOOL
Zdzislaw Bieganski, Brushwood, Kingsbourne Green, Harpenden, Hertfordshire, England
Filed Oct. 10, 1975, Ser. No. 621,386
Claims priority, application United Kingdom, Apr. 23, 1975, 97084/75
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—61

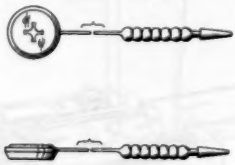


243,150
LOCK COVER
James R. Dykes, 540 E. 60th St., Savannah, Ga. 31405
Filed July 11, 1974, Ser. No. 487,674
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—137

243,151
CABLE VIBRATION DAMPER
Raymond R. Bouche, 9419 Cordero Ave., Tujunga, Calif. 91042
Filed Feb. 23, 1976, Ser. No. 660,010
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—230



243,152
FILAMENT FASTENER
Jack D. Keefe, Dayton, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio
Filed Mar. 20, 1975, Ser. No. 560,434
Term of patent 14 years
Int. Cl. D9—*06*
U.S. Cl. D8—243

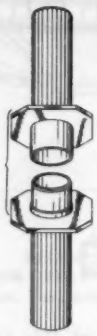


243,153
ARTICLE HOLDER
Horace Solomon, New York, N.Y., assignor to Solo Products, Corporation, Englewood, N.J.
Filed Feb. 26, 1976, Ser. No. 661,667
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—255

243,154
THREADED FASTENERS
Hilmar K. Dieme, Westfield, N.J., assignor to Amerace Corporation, New York, N.Y.
Division of Ser. No. 416,440, Nov. 16, 1973. This application May 23, 1975, Ser. No. 580,412
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—267

243,155
PLASTIC DRUM
Richard L. Bonnett, Eldora, Iowa 50627
Continuation-in-part of Ser. No. 459,062, April 8, 1974. This application Oct. 8, 1975, Ser. No. 620,889
Term of patent 14 years
Int. Cl. D9—*02*
U.S. Cl. D9—170

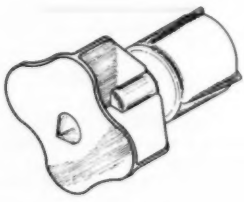
243,156
TOOTHBRUSH CONTAINER
Charles S. Fentules, 15 Illinois Ave., Youngstown, Ohio 44505
Filed Aug. 8, 1975, Ser. No. 603,151
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—216



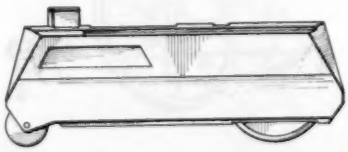
243,157
END CLOSURE FOR A CONTAINER
Arthur P. Zundel, Chicago, Ill., assignor to National Can Corporation, Chicago, Ill.
Filed Aug. 10, 1973, Ser. No. 387,337
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—255

243,158
FORM FOR FILLING BAGS
Edward J. Bolwell, Yonkers, N.Y., assignor to Topps-All Products of Yonkers, Inc., Yonkers, N.Y.
Filed Feb. 7, 1975, Ser. No. 547,824
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—294

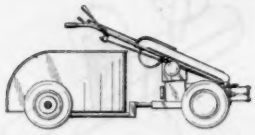
243,159
SURVEY MONUMENT BASE
Peter Berntsen, and Phillip R. Peterson, both of P.O. Box 3025, Madison, Wis. 53704
Filed Sept. 19, 1975, Ser. No. 616,272
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—66

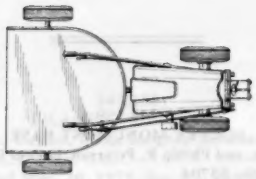


243,160
LINEAR DISTANCE MEASURING COMPUTER
Hans Bud, 71 Northway, London, N.W. 11, England
Filed Mar. 13, 1975, Ser. No. 557,905
Term of patent 3½ years
Int. Cl. D10—*04*
U.S. Cl. D10—70

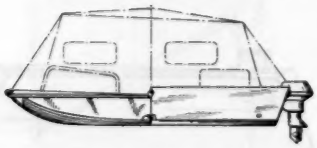


243,161
MULTI-PURPOSE SELF-PROPELLED VEHICLE
Paul E. Tolar, 401 N. West St., Wichita, Kans. 67203
Filed Sept. 29, 1975, Ser. No. 617,275
Term of patent 14 years
Int. Cl. D12—*14*
U.S. Cl. D12—1



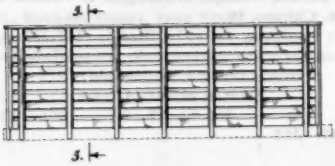


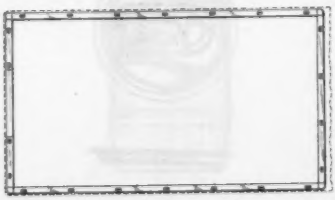
243,162
COLLAPSIBLE TRAILER BOAT
Alexei Kirillovich Konstantinov, ulitsa Svobody, 15, kv. 86; Vladimir Vasilievich Volkov, ulitsa Svobody, 15, kv. 52; Nikolai Alexandrovich Pogorelov, ulitsa Svobody, 15, kv. 17; Viktor Petrovich Gaschenko, Bolshoi Prospekt, 46, kv. 45, and Igor Vladimirovich Lukashkov, Bolshoi Prospekt, 46, kv. 30, all of Taganrog, U.S.S.R.
Filed Feb. 12, 1975, Ser. No. 549,458
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—2



243,163
RECREATIONAL BOAT OR THE LIKE
Max C. Sutton, Southfield, Mich., assignor to Henry H. Hook, Franklin, Mich., a part interest
Filed Sept. 19, 1975, Ser. No. 614,950
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—62

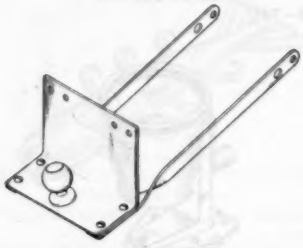
243,164
TRUCK BED BODY
Harold W. Knapheide, III, Quincy, Ill., assignor to The Knapheide Manufacturing Co., Quincy, Ill.
Filed Aug. 13, 1975, Ser. No. 604,132
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—98





243,165
BICYCLE FRAME
Marshall A. Wheeler, P.O. Box 1267, Downey, Calif. 90240
Filed Jan. 22, 1976, Ser. No. 651,490
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—111

243,166
MOTOR CYCLE HITCH
Larry E. Jones, Sherman, Tex., assignor to Randy W. Pettit and Larry E. Jones
Filed Nov. 13, 1975, Ser. No. 631,685
Term of patent 14 years
Int. Cl. D12—*11, 16*
U.S. Cl. D12—114

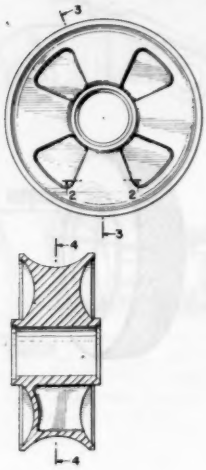


243,167
FORK FOR FRONT BICYCLE WHEEL
Marshall A. Wheeler, P.O. Box 1267, Downey, Calif. 90240
Filed Jan. 22, 1976, Ser. No. 651,491
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—118

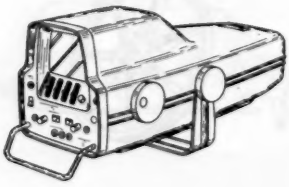
243,168
TIRE FOR A VEHICLE WHEEL
Claude Albert Hart, Sutton Coldfield; Brian Howard Holmes, Birmingham, both of England, and Karl Gebert, Klein, Auheim, Germany, assignors to Dunlop Limited, London, England
Filed July 22, 1974, Ser. No. 490,551
Claims priority, application United Kingdom, Jan. 22, 1974, 965383/74
Disclosure was also published under second Trial Voluntary Protest Program on Apr. 6, 1976
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—146

243,169
MOTOR-CYCLE WHEEL
Toshiyuki Suzuki, Iwata, and Kenji Ekuan, Tokyo, both of Japan, assignors to Yamaha, Hatsudoki Kabushiki Kaisha, Iwata, Japan
Filed Sept. 24, 1975, Ser. No. 616,150
Claims priority, application Japan, Mar. 27, 1975, 50-12199
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—205

243,170
WHEEL CENTER
Joseph R. May, Chatham, and Donald F. Morgan, Bloomingdale, both of N.J., assignors to Amerace Corporation, New York, N.Y.
Filed May 27, 1975, Ser. No. 580,834
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—211



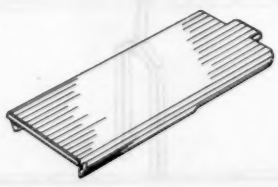
243,171
TELEVISION CAMERA
Kiyoshi Sakashita, Osaka, Japan, assignor to Sharp Corporation
Filed May 28, 1975, Ser. No. 581,629
Claims priority, application Japan, Nov. 29, 1974, 49-42790
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—1



243,172
OBJECTIVE LENS FOR A MICROSCOPE
Toshifumi Uetake, and Tutomu Tojyo, both of Hachioji, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan
Filed Oct. 10, 1975, Ser. No. 621,285
Claims priority, application Japan, Apr. 14, 1975, 50-14731
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—63

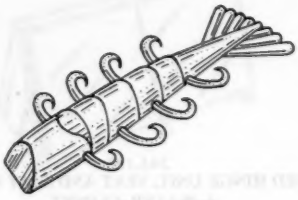
243,173
PENCIL SHARPENER
John M. Bitner, Williamsville, N.Y., assignor to American Can Company, Greenwich, Conn.
Filed June 2, 1975, Ser. No. 582,769
Term of patent 14 years
Int. Cl. D19—*06*
U.S. Cl. D19—74

243,174
CARTRIDGE MAGAZINE COVER
Jacob Sofinowski, III, Baldwin, Md., assignor to AAI Corporation, Cockeysville, Md.
Filed Dec. 5, 1975, Ser. No. 637,907
Term of patent 14 years
Int. Cl. D22—*99*
U.S. Cl. D22—7



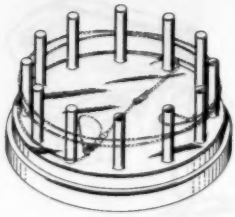
243,175
FISHING LURE
Robert Glynn Carver, P.O. Box 44, Athens, La. 71003
Filed Apr. 26, 1976, Ser. No. 680,205
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—27

243,176
FISHING LURE
Robert Glynn Carver, P.O. Box 44, Athens, La. 71003, and Glen R. Welle, Rte. 1, Box 163, Minden, La. 71055
Filed Apr. 26, 1976, Ser. No. 680,206
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—27



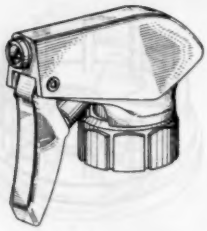
243,177
TROLLING WEIGHT
James A. Kammeraad, Holland, Mich., assignor to DFK Inc., Holland, Mich.
Filed Mar. 1, 1976, Ser. No. 662,697
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—30

243,178
HOLDER FOR FISHING LURE AND LEADER
Henry P. Sahly, 11825 18th Ave. N., Plymouth, Minn. 55427
Filed May 2, 1974, Ser. No. 466,266
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—99

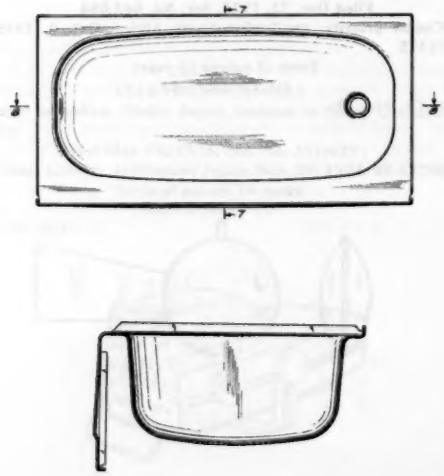


243,179
POP-UP SPRINKLER
Abraham Stephanus Le Roux Jooste, 13 Exmouth Road, Plumstead, Cape Town, Cape Province, and Jurgen Momsen, 21 Dell St., Tiervlei, Bellville, Cape Province, both of South Africa
Filed Dec. 22, 1975, Ser. No. 643,084
Claims priority, application South Africa, Oct. 6, 1975, 75/1375
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—7

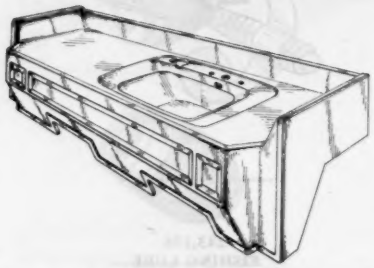
243,180
HAND SPRAYER
Joseph Benedict Federico, North Palm Beach; Walter Herbert Wesner, Ft. Lauderdale, and John Richard Cary, Miami Lakes, all of Fla., assignors to The AFA Corporation, Miami Lakes, Fla.
Filed Feb. 13, 1976, Ser. No. 657,809
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—17



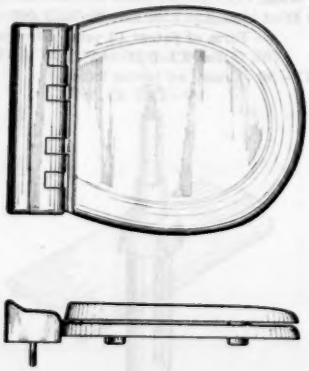
243,181
BATHTUB
Henry M. Stairs, Jr., Somerville, N.J., assignor to American Standard, Inc., New York, N.Y.
Filed Mar. 12, 1976, Ser. No. 666,282
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—55



243,182
COMBINATION VANITY AND LAVATORY
Merritt W. Seymour, Sylvania, and David D. Tompkins, Columbus, both of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio
Filed Oct. 6, 1975, Ser. No. 620,480
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—59

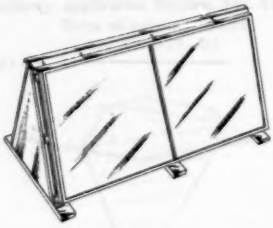


243,183
COMBINED HINGE UNIT, SEAT AND SEAT COVER FOR A WATER CLOSET
Charley Winfield Davis, Jr., 12 Wilmont Ave., White Plains, N.Y. 10605
Continuation-in-part of Ser. No. 515,536, Oct. 17, 1974, abandoned. This application Dec. 24, 1975, Ser. No. 644,032
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—71

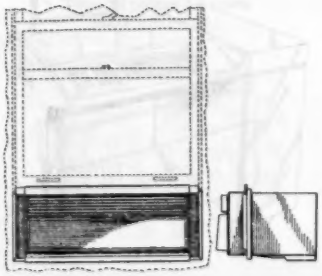


243,184
COMBINED FIREPLACE HEATER AND GRATE
Kenneth James Solinski, 1900 32nd St., Bay City, Mich. 48706
Filed Apr. 3, 1975, Ser. No. 564,764
Term of patent 14 years
Int. Cl. D23—*03*; D7—*08*
U.S. Cl. D23—94

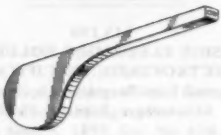
243,185
SELF-CONTAINED SOLAR HEATING SYSTEM MODULE
Kenneth E. Parker, 6121 Belen St., Long Beach, Calif. 90815, and Alvin L. Ottum, 296 Vista Conejo, Newbury Park, Calif. 91320
Filed Feb. 3, 1976, Ser. No. 655,009
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—127



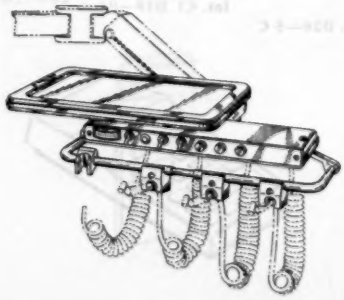
243,186
AIR CONDITIONER HOUSING FOR MOUNTING IN DOUBLE-HUNG WINDOWS
James W. Bruner, Sr., and George W. Sisk, Jr., both of Evansville, Ind., assignors to Whirlpool Corporation, Benton Harbor, Mich.
Division of Ser. No. 260,044, June 5, 1972. This application Nov. 15, 1974, Ser. No. 524,033
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—141



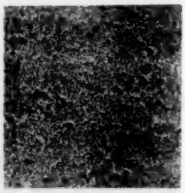
243,187
DENTAL FLOSS DISPENSER
William E. Bennington, 5 Fillmore Drive, Sarasota, Fla. 33577
Division of Ser. No. 367,953, June 7, 1973, Pat. No. Des. 237,498.
This application Aug. 22, 1975, Ser. No. 606,951
Term of patent 14 years
Int. Cl. D24—*99*
U.S. Cl. D24—11 D



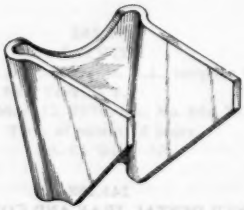
243,188
COMBINED DENTAL TRAY AND CONTROL UNIT THEREFOR
Robert H. Meyer, Newberg, Oreg., assignor to A-DEC, Inc., Newberg, Oreg.
Filed Feb. 11, 1976, Ser. No. 657,147
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—1 B



243,189
BUILDING BOARD
Kiyoshi Hori, Suita, Japan, assignor to Nippon Paint Co., Ltd., Osaka, Japan
Filed Mar. 31, 1975, Ser. No. 563,833
Claims priority, application Japan, Dec. 26, 1974, 50-45198
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—84

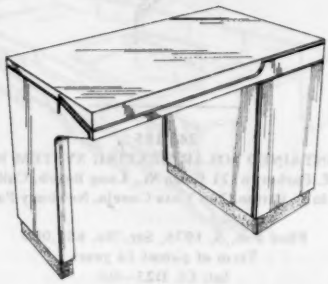


243,190
EMISSION ELECTRODE HOLDER FOR ELECTROSTATIC PRECIPITATOR
Filip Knutsson, and Lars Bergstrom, both of Vaxjo, Sweden, assignors to Aktiebolaget Svenska Flaktfabriken, Nacka, Sweden
Filed May 29, 1975, Ser. No. 581,892
Claims priority, application Germany, Dec. 4, 1974, URA 808/74
Term of patent 14 years
Int. Cl. D8—*08;* D13—*03*
U.S. Cl. D26—1 R

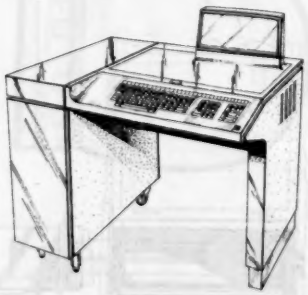


243,191
CALCULATOR
John Hunter Pemberton, Cambridge, England, assignor to Sinclair Radionics Limited, Huntington, England
Filed June 25, 1975, Ser. No. 590,065
Claims priority, application United Kingdom, Jan. 15, 1975, 969439/75
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D26—5 C

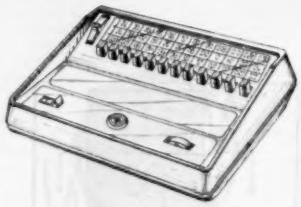
243,192
ENCODER CONSOLE WITH REMOVABLE DESK TOP
Richard G. Clayton, Detroit; Jerry J. Sims, Southfield; Gilbert L. McCauley, Detroit, and Thomas C. Abrahamsen, Birmingham, all of Mich., assignors to Burroughs Corporation, Detroit, Mich.
Filed Apr. 23, 1975, Ser. No. 570,668
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D26—5 C



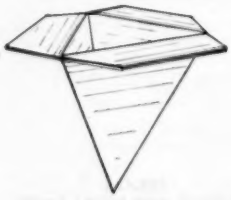
243,193
DATA ENTRY KEY STATION
Richard G. Clayton, Detroit; Thomas C. Abrahamsen, Birmingham, both of Mich.; Jack K. Beduhn, Westlake Village, and Norman P. Guetschoff, Jr, Newbury Park, both of Calif., assignors to Burroughs Corporation, Detroit, Mich.
Filed Dec. 19, 1975, Ser. No. 642,487
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D26—5 C



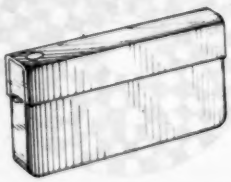
243,194
CABLE TELEVISION CONVERTER CONTROL TERMINAL OR THE LIKE
Svein T. Nordberg, and Donald R. Shaner, both of El Paso, Tex., assignors to GTE Sylvania Incorporated, Stamford, Conn.
Filed Mar. 17, 1975, Ser. No. 558,968
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D26—14 K



243,195
LINING FOR ASH TRAY, DUST BIN AND THE LIKE
Alf B. Magnusson, Goteborg, Sweden, assignor to Bengt Petersson New Products Investment AB, Goteborg, Sweden
Filed June 17, 1974, Ser. No. 480,117
Claims priority, application Sweden, Jan. 11, 1974, 46/74
Term of patent 14 years
Int. Cl. D27—*03*
U.S. Cl. D27—8



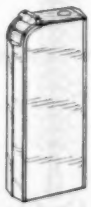
243,196
LIGHTER
Franz Alban Stuetzer, Muhlheim (Main), Germany, assignor to Sunbeam Corporation, Chicago, Ill.
Filed Sept. 5, 1975, Ser. No. 610,585
Claims priority, application Germany, Mar. 19, 1975, 59860
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—36



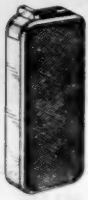
243,197
LIGHTER
Franz Alban Stuetzer, Muhlheim (Main), Germany, assignor to Sunbeam Corporation, Chicago, Ill.
Filed Sept. 5, 1975, Ser. No. 610,596
Claims priority, application Germany, Mar. 19, 1975, 59860
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—42

243,198
LIGHTER
Franz Alban Stuetzer, Muhlheim (Main), Germany, assignor to Sunbeam Corporation, Chicago, Ill.
Filed Sept. 5, 1975, Ser. No. 610,597
Claims priority, application Germany, Mar. 19, 1975, 9860
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—42

243,199
LIGHTER
Franz Alban Stuetzer, Muhlheim (Main), Germany, assignor to Sunbeam Corporation, Chicago, Ill.
Filed Sept. 5, 1975, Ser. No. 610,598
Claims priority, application Germany, Mar. 19, 1975, 9860
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—42

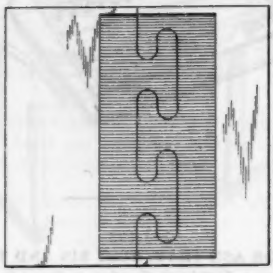


243,200
LIGHTER
Franz Alban Stuetzer, Mulheim (Main), Germany, assignor to Sunbeam Corporation, Chicago, Ill.
Filed Sept. 5, 1975, Ser. No. 610,599
Claims priority, application Germany, Mar. 19, 1975, 9860
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—42

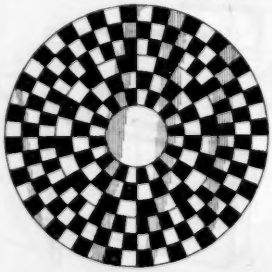


243,201
COMBINED FLAG STAND AND GLOBE
Matthew Edward Wrenn, 8711 63rd Ave., College Park, Md. 20740
Filed Feb. 6, 1976, Ser. No. 656,066
Term of patent 14 years
Int. Cl. D11—*02*; D19—*07*
U.S. Cl. D11—166

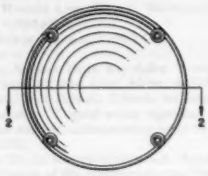
243,202
BOARD FOR A GAME
Richard Charles Peter Guignard, 38A, The Avenue, Radlett, Hertfordshire, England
Filed July 8, 1975, Ser. No. 594,056
Claims priority, application United Kingdom, Jan. 9, 1975, 969329/75
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS



243,203
CIRCULAR GAME BOARD
Joe Lewis Wilkins, 5252 Balboa Arms Drive, Apartment No. 283, San Diego, Calif. 92117
Filed Aug. 13, 1975, Ser. No. 604,240
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS



243,204
TOY CONSTRUCTION PIECE
Lester V. Molenaar, Box 777, W. Highway 40, Willmar, Minn. 56201
Filed Feb. 18, 1975, Ser. No. 550,761
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 GG

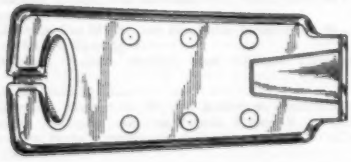


243,205
SIMULATIVE TOY VEHICLE
Yim Hei Joseph Yeung, Joylite Bldg. 99, Wai Yip St., Kwun Tong, Kowloon, Hong Kong
Filed Apr. 18, 1975, Ser. No. 569,200
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AM

243,206
SKATE BOARD
Kent N. Sherwood, Venice, Calif., assignor to Kent Sherwood, Venice, Calif.
Filed May 27, 1975, Ser. No. 581,268
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ

243,207
CULTIVATOR TINE
Cornelius Van der Lely, 7, Bruschenrain, Zug, Switzerland
Filed Nov. 19, 1975, Ser. No. 633,565
Claims priority, application Belgium, May 27, 1975, 50257
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—29

243,208
GUITAR HEAD
Hari Matsuda, Evanston, Ill., assignor to G. Leblanc Corporation, Kenosha, Wis.
Division of Ser. No. 370,772, June 18, 1973, Pat. No. 235,220.
This application Sept. 23, 1974, Ser. No. 508,524
Term of patent 14 years
Int. Cl. D17—*03*
U.S. Cl. D56—1 A



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 25TH DAY OF JANUARY, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. H. Robins Company, Incorporated: *See*—
Tankersley, Robert Walker, Jr., 4,005,224.

A/S Akers Mek. Verksted: *See*—
Oiern, Per Jorgen; and Osmundsvaag, Knut Helge, 4,004,535.

A. Stucki Company: *See*—
Wiebe, Donald; and Wagner, John H., 4,004,525.

AAI Corporation: *See*—
Barr, Irwin R., 4,004,574.

Abbott Laboratories: *See*—
Gendrich, Ronald Lee; Rippel, Riemond Henry; and Seely, John Hunter, 4,005,063.
Johnson, Edwin Samuel, 4,005,194.

Abe, Akira: *See*—
Yamamoto, Nobuo; Hori, Kiyotaka; Yoneyama, Masakazu; Nakayama, Yasuhiro; and Abe, Akira, 4,004,927.

Abramson, Paul; and Appel, Ulrich, to International Business Machines Corporation. Digital voice signaling with digital echo detection and voice activity compression used to cancel echo. 4,005,276, Cl. 179-170.200.

Acker, Laurent G., to Vestra-Union S.A. Apparatus for correcting the mutual orientation of the patterns on two layers of cloth. 4,004,527, Cl. 112-121.140.

Acker, Otto H. Piston-cylinder assembly. 4,004,557, Cl. 123-65.0VC.

Acorn Building Components, Inc.: *See*—
DiFazio, Joseph, 4,004,389.

Adamation, Inc.: *See*—
Schuler, Stephen H., 4,004,682.

Adams, James E., Jr.: *See*—
Haas, Werner E. L.; Adams, James E., Jr.; and Richter, Bela, 4,005,032.

Adams, Kenneth Douglas; and Ostapczuk, Edward Walter, to Singer Company, The. Heat sink for an appliance circuit board. 4,004,528, Cl. 112-218.00R.

Adamsky, Allan F.: *See*—
Edgar, William D.; Sustarsic, John D.; and Adamsky, Allan F., 4,004,985.

Adamus, Hans: *See*—
Franzer, Wolfgang; and Adamus, Hans, 4,004,986.

Adelman, Albert H.: *See*—
Nathan, Richard A.; Schwerzel, Robert E.; Adelman, Albert H.; and Wyant, Robert E., 4,004,572.

Aeronutronic Ford Corporation: *See*—
Schlacter, Michael M., 4,005,240.

Agence Nationale de Valorisation de la Recherche (ANVAR): *See*—
Avrameas, Stratis; Broun, Georges; Selegny, Eric; and Thomas, Daniel, 4,004,979.
Baruch, Pierre; Borel, Joseph; and Monnier, Joel, 4,004,950.
Chapiro, Adolphe; and Mankowski, Zbigniew, 4,005,059.
Thourel, Leo Y., 4,005,301.

AGFA-Gevaert, A.G.: *See*—
Zangenfeind, Helmut; and Kustner, Gerhard, 4,004,724.

AGFA-GEVAERT N.V.: *See*—
Van Besauw, Jan Frans; and Poot, Albert Lucien, 4,004,925.
Vrancken, Marcel Nicolas; and Lassig, Wolfgang, 4,004,924.
Willems, Jozef Frans; and Janssens, Wilhelmus, 4,004,926.

Agnew, Mark Charles; Best, James Jacob; and Gudgel, Willard Leon, to International Business Machines Corporation. Hopper mechanism. 4,004,795, Cl. 271-10.000.

Airheart, Franklin B.; and Martins, Samuel J., to Airheart Products, Inc. Split brake disc. 4,004,661, Cl. 188-218.0XL.

Airheart Products, Inc.: *See*—
Airheart, Franklin B.; and Martins, Samuel J., 4,004,661.

Airwick Industries, Inc.: *See*—
Hadtke, Frederick B., 4,004,734.

Akademie der Wissenschaften der DDR: *See*—
Gaehde, Joachim; Gesierich, Adolf; and Loeschcke, Ingrid, 4,005,238.

Akatsuka, Takeaki; Kato, Akinori; Kojima, Teiryo; Inaba, Sinji; and Higashino, Kohichi, to Toray Industries, Inc. Method and apparatus for detecting and recording abnormal conditions in the operation of spinning machines. 4,005,392, Cl. 340-172.500.

Aker, Walter W.; and Naydan, Theodore T., to Environment/One Corporation. Continuous high velocity fluid jet system. 4,004,737, Cl. 239-102.000.

AKG Akustische u. Kino-Gerate Gesellschaft m.b.H.: *See*—
Gorike, Rudolf; Pless, Ernst; Fidi, Werner; and Fritz, Alexander, 4,005,267.
Gorike, Rudolf, 4,005,278.

Akiba, Yoshio: *See*—
Kusano, Kazuto; Ando, Hiroshi; Kagami, Takashi; Uchida, Azusa; Akiyama, Noboru; Ueda, Yoshihiro; and Akiba, Yoshio, 4,005,017.

Akisato, Naohiro, to Minolta Camera Kabushiki Kaisha. Photocopying machine sheet separation device. 4,004,798, Cl. 271-172.000.

Akiyama, Noboru: *See*—
Kusano, Kazuto; Ando, Hiroshi; Kagami, Takashi; Uchida, Azusa; Akiyama, Noboru; Ueda, Yoshihiro; and Akiba, Yoshio, 4,005,017.

Aktiebolaget Atomenergi: *See*—
Margen, Peter Heinrich Erwin, 4,004,984.
Mogard, Johan Hilding, 4,004,972.

Aktiebolaget Ljungmans Verkstader: *See*—
Leander, Bo Ingvar, 4,005,412.

Aktiebolaget Platmanufaktur: *See*—
Larsson, Lars Goran; and Sundberg, Sture Ingemar, 4,004,398.

Alba, Louis P. Drive means. 4,004,466, Cl. 74-229.000.

Albert Obrist AG: *See*—
Ruch, Heinz, 4,005,101.

Albrecht, Fritz. Scanning device and method for automatic focusing. 4,005,443, Cl. 354-25.000.

Alexander, Alan Moana, to Wrightson NMA Limited. Apparatus for flushing ova from cows or mares. 4,004,588, Cl. 128-241.000.

Alexandrov, Anatoly Julianovich; Grushko, July Sergeevich; Makarov, Evgeny Fredovich; Mishin, Konstantin Yakovlevich; and Baltrunas, Daljus Antanas Jono. Radiation source for mossbauer investigations of tellurium compounds and method of preparing same. 4,004,970, Cl. 176-16.000.

Alfa-Laval AB: *See*—
Stenstrom, Lennart Arvid, 4,004,553.

Ali, Gregory F. Buffing and polishing device. 4,004,316, Cl. 15-230.160.

Allen, Linus S., to Mobil Oil Corporation. Neutron-neutron logging. 4,005,290, Cl. 250-266.000.

Alleraid Company, Inc.: *See*—
Geaney, Sheila A., 4,004,584.

Allis-Chalmers Corporation: *See*—
Empey, Robert M., 4,004,700.

Allison, Darris E. Boat hull. 4,004,534, Cl. 114-274.000.

Allmanna Svenska Elektriska Aktiebolaget: *See*—
Folgero, Kare; and Norberg, Lars-Gunnar, 4,004,792.

Amano, Yoshifumi, to Sony Corporation. Flat panel display apparatus. 4,005,402, Cl. 340-324.00M.

Amberntsson, Jan Roger; Andersson, Rober Ingemar; and Sultan, Stig Bertil, to Facit Aktiebolag. Printing head for ink jet printer. 4,005,440, Cl. 346-140.00A.

Amelio, Armand F.; and Rosen, Kenneth M., to United Technologies Corporation. Infra-red suppressor for use with turbo-shaft engine. 4,004,416, Cl. 60-264.000.

Amerace Corporation: *See*—
Biblin, Daniel L.; and Preziosi, Joseph R., 4,004,626.

American Chain & Cable Company, Inc.: *See*—
Clewett, Merle E.; and Henig, Seymour, 4,004,681.

American Color & Chemical Corporation: *See*—
Sweeny, Charles D., 4,005,011.

American Cyanamid Company: *See*—
Spicer, Larry Dean; Pensack, Joseph Michael; Wilbur, Robert Daniel; and Demkovich, Gary Michael, 4,005,140.

American Flange & Manufacturing Co., Inc.: *See*—
Simkus, Vyto, 4,004,709.

American Hoechst Corporation: *See*—
Hensel, Roy E., 4,004,923.

American Optical Corporation: *See*—
Yates, Colin K.; and Jastrzebski, Eugene C., 4,005,323.

Ametek, Inc.: *See*—
Harland, Philip W., 4,004,546.

Ammesdorfer, Fritz: *See*—
Sorgatz, Ulrich; and Ammesdorfer, Fritz, 4,004,662.

Andeno B.V.: *See*—
Gubbels, Jan M. H.; and Houbiers, Johannes P. M., 4,005,088.

Anders Ruben Rausing: *See*—
Rausing, Ruben Anders; and Ohlsson, Ingemar Wilhelm, 4,004,727.

Anderson, John M.: *See*—
Glascock, Homer H., Jr.; and Anderson, John M., 4,005,330.

Anderson, Phillip R.; and van Eepoel, Robert P., to United States of America, Navy. Catacoustic navigating system. 4,005,383, Cl. 340-3.00R.

Anderson, Ralph F.; and Strombeck, Leo, to Anderson, Ralph F. Article wrapping machine. 4,004,400, Cl. 53-182.00R.

Andersson, Rober Ingemar: *See*—
Amberntsson, Jan Roger; Andersson, Rober Ingemar; and Sultan, Stig Bertil, 4,005,440.

Ando, Hiroshi: *See*—
Kusano, Kazuto; Ando, Hiroshi; Kagami, Takashi; Uchida, Azusa; Akiyama, Noboru; Ueda, Yoshihiro; and Akiba, Yoshio, 4,005,017.

Ando, Kiyoatsu; Nakajima, Hiroshi; and Ueno, Hiroshi, to Mitsubishi Jukogyo Kabushiki Kaisha. Device for preventing foreign matters from being sucked into a gas turbine engine for an aircraft. 4,004,760, Cl. 244-53.00B.

Ando, Kunio, to Fuji Photo Optical Co., Ltd. Automatic exposure control means. 4,005,445, Cl. 354-44.000.

Ando, Masayasu: *See*—
Utsumi, Isamu; Endo, Tomio; Kamata, Tadaaki; and Ando, Masayasu, 4,005,200.

Ando, Susumu: *See*—
Kinoshita, Mototaka; Sekiguchi, Yoshimitu; and Ando, Susumu, 4,005,009.

Ando, Takao: *See*—
Watanabe, Akinori; and Ando, Takao, 4,004,513.

Andre, Thierry: *See*—
Melchior, Jean; and Andre, Thierry, 4,004,414.

Andrejkovics, Richard S., to United States of America, Army. Projectile fuze. 4,004,521, Cl. 102-80.000.

Andrews, James D.: *See*—
Tyler, Roger K.; and Andrews, James D., 4,004,992.

Andrews, Peter. Electric incandescent lamp combination fixture device. 4,005,334, Cl. 315-208.000.

Andronov, Mikhail Alexandrovich; Bakun, Anatoly Nikolaevich; Mezhevich, Felix Evgenievich; Petrov, Mikhail Ivanovich; Belov, Jury Ivanovich; Feldman, Alexandr Yakovlevich, deceased; and by Feldman, Raisa Alexandrovna, administratrix. Woven band. 4,004,616, Cl. 139-383.00R.

Andrus, Joseph M., to Stauffer Chemical Company. Electrochemical removal of contaminants. 4,004,994, Cl. 204-149.000.

Annegarn, Joseph Johannes Maria. Descaling bent rod with separated cleaning particles. 4,004,374, Cl. 51-5.00A.

Antek, Inc.: *See*—
Seagrave, Earl M., Jr., 4,004,750.

Anthony's Manufacturing Company, Inc.: *See*—
Heaney, James J., 4,004,370.

Aoki, Katashi, to Nissei Plastics Industrial Co., Ltd. Hydraulic motor. 4,004,498, Cl. 91-476.000.

Aoki, Shingi: *See*—
Machi, Sueo; Kawamura, Keita; Aoki, Shingi; Kawakami, Waichiro; and Hashimoto, Shoji, 4,004,995.

Aoki, Yukio; Wakita, Shizuo; Kato, Shoichi; and Ishida, Shuichi, to Nippon Kayaku Kabushiki Kaisha. Derivatives of propargyl or alkenyl phenyl ether and use thereof as acaricide. 4,005,148, Cl. 260-607.0AR.

Appel, Ulrich: *See*—
Abramson, Paul; and Appel, Ulrich, 4,005,276.

Apritogepgyar: *See*—
Szilva, Andras, 4,004,858.

Arai, Yoshiyuki: *See*—
Morinaga, Tsuyoshi; Nakazawa, Yuji; Arimoto, Kyozo; Takahashi, Katuhiko; and Arai, Yoshiyuki, 4,005,107.

Araseki, Takashi; Ochiai, Kazuo; Ogihara, Takashi; and Tanaka, Shunji, to Nippon Electric Company, Ltd. Echo controller comprising a mode switch for switching echo suppressor and canceller. 4,005,277, Cl. 179-170.200.

Arbrook, Inc.: *See*—
Wihksne, Allen, 4,004,691.

Arimoto, Kyozo: *See*—
Morinaga, Tsuyoshi; Nakazawa, Yuji; Arimoto, Kyozo; Takahashi, Katuhiko; and Arai, Yoshiyuki, 4,005,107.

Arnold, Fred E.: *See*—
Kovar, Robert F.; and Arnold, Fred E., 4,005,144.

Arnold, Zdenek: *See*—
Sorm, Frantisek; Svoboda, Miroslav; Zavada, Jiri; Slama, Karel; and Arnold, Zdenek, 4,005,150.

Arsenault, Guy P., to Massachusetts Institute of Technology. Ionization method for mass spectrometry. 4,005,291, Cl. 250-282.000.

Arthur A. Collins, Inc.: *See*—
Collins, Arthur A.; Pedersen, Robert D.; and Bellamy, John C., II, 4,005,272.

Aruanno, Angela, to Lamy S.r.l. Cassette magazine for motion-picture films. 4,004,746, Cl. 242-55.19A.

Arumugham, Rangaswamy, to GTE Sylvania Incorporated. AFC circuit. 4,005,256, Cl. 358-195.000.

Asahi Kasei Kogyo Kabushiki Kaisha: *See*—
Seko, Maomi; Ogawa, Shinsaku; Yoshida, Mitsuo; and Nakamura, Akira, 4,005,004.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See*—
Kobayashi, Takumi, 4,005,459.
Mori, Chiharu; and Kawasaki, Masahiro, 4,004,853.

Asai, Satosi; and Matsuki, Isamu, to Matsuki-Seisakusho. Tape-operating apparatus adapted for use either with an endless loop type cartridge or a coplanar type cassette. 4,005,487, Cl. 360-94.000.

Asai, Satosi; and Matsuki, Isamu, to Matsuki-Seisakusho. Tape-operating apparatus adapted for use either with an endless loop type cartridge or a coplanar type cassette. 4,005,488, Cl. 360-94.000.

Asai, Satosi; and Matsuki, Isamu, to Matsuki-Seisakusho. Tape-operating apparatus adapted for use either with an endless loop type or a coplanar type cassette. 4,005,489, Cl. 360-94.000.

Ashland Oil, Inc.: *See*—
Graham, Curtis Michael, 4,005,247.

Associated Paper Mills Limited, The: *See*—
Bridge, Frank; and Singh, Tej Kuldip, 4,004,324.

Astratronics, Inc.: *See*—
Castonguay, Leon H., 4,004,564.

Atlanta Grotnes Machine Company: *See*—
Grotnes, Eugene R., 4,004,529.

Atlantic Richfield Company: *See*—
Dransfield, Clifford D., 4,004,651.
Weidenaar, Bernard E.; Voelz, Frederick L.; Simnick, James J.; and Moskovich, Peter P., Jr., 4,004,621.
Zehner, Lee R.; Sauer, Richard W., deceased; and Heffron, John J., executor, 4,005,128.
Zehner, Lee R., 4,005,129.
Zehner, Lee R., 4,005,130.
Zehner, Lee R., 4,005,131.

Audichron Company, The: *See*—
Walker, Walter P.; Smith, Leary W.; Cofer, Frank H., Jr.; and Lewis, Jack E., 4,005,491.

Audiffred, Sidney J.: *See*—
Woody, Albert L.; Audiffred, Sidney J.; and Steury, Howard C., 4,004,417.

Aurousseau, Michel Emile Marie: *See*—
Robba, Max Fernand; and Aurousseau, Michel Emile Marie, 4,005,095.

Austin, James R.: *See*—
Kossiakoff, Alexander; and Austin, James R., 4,005,415.

Auto Control Tap of Canada Limited: *See*—
Williams, Roger A.; and Dietz, Robert E., 4,004,715.

Automotive Products Company Limited: *See*—
Jenkins, Stanley Frederick Noel, 4,004,762.

AVL AG: *See*—
List, Helmut; and Fredericks, George, 4,004,331.

Avnet, Inc.: *See*—
Guha, Dwipendra Nath, 4,004,816.

Avrameas, Stratis; Broun, Georges; Selegny, Eric; and Thomas, Daniel, to Agence Nationale de Valorisation de la Recherche (ANVAR). Preparation of active proteins cross-linked to inactive proteins. 4,004,979, Cl. 195-68.000.

Aya, Masahiro; Miyamoto, Masao; Fukazawa, Nobuo; and Yamagishi, Masaaki, to Bayer Aktiengesellschaft. P-Chlorobenzyl N,N-hexamethylenethiolcarbamate. 4,005,071, Cl. 260-239.0BF.

Aztec Manufacturing Company: *See*—
Eschbach, Robert C.; and Colligan, John B., 4,004,373.

B.W.B. Controls, Inc.: *See*—
Theriot, Gerald F., 4,004,610.

Baba, Yoshio; and Takashima, Akira, to Sumitomo Light Metal Industries, Ltd. Freely machinable aluminum alloy. 4,005,243, Cl. 428-469.000.

Babcock & Wilcox Company, The: *See*—
Forst, Donald Laverne; and Schrengauer, Edwin Benedict, 4,004,647.
Matty, Robert E.; and Strom, Stephen S., 4,004,966.

Bachelder, Patrick Eugene; and Sumner, William David, to Fisher Controls Company, Inc. Quick closing emergency valve. 4,004,601, Cl. 137-77.000.

Back, Gerhard: *See*—
Beffa, Fabio; and Back, Gerhard, 4,005,065.

Bader, Gunther: *See*—
Bretschneider, Hermann; Klotzer, Wilhelm; Bader, Gunther; and Lutz, August, 4,005,100.

Badische Anilin- & Soda-Fabrik Aktiengesellschaft: *See*—
Fischer, Roman; Goetz, Norbert; and Mueller, Herbert, 4,005,147.

Bagger-En Constructiebedrijf Johan Klip B.V.: *See*—
Klip, Johan, 4,004,359.

Bailey Meter Company: *See*—
Walker, Robert R., 4,004,730.

Baisch, Thelma E. Electrically heated gravy warming ladle. 4,005,310, Cl. 219-227.000.

Baker Perkins Holdings Limited: *See*—
Steels, Gordon, 4,004,716.

Bakun, Anatoly Nikolaevich: *See*—
Andronov, Mikhail Alexandrovich; Bakun, Anatoly Nikolaevich; Mezhevich, Felix Evgenievich; Petrov, Mikhail Ivanovich; Belov, Jury Ivanovich; Feldman, Alexandr Yakovlevich, deceased; and Feldman, Raisa Alexandrovna, administratrix, 4,004,616.

Balda-Werke Photographische Gerate & Kunststoff GmbH & Co. KG: *See*—
Lange, Karl Heinz, 4,005,461.

Baldus, Heinz Dieter: *See*—
Heinemann, Otto; Schmits, Heinz-Herbert; and Baldus, Heinz Dieter, 4,004,740.

Balhorn, Milo G., to Old Fort International Inc. Block molding machine with feed drawer control means. 4,004,869, Cl. 425-159.000.

Balkus, Carl E., Jr. Edge guide attachment for a paint brush. 4,004,318, Cl. 15-248.00R.

Baltrunas, Daljus Antanas Jono: *See*—
Alexandrov, Anatoly Julianovich; Grushko, July Sergeevich; Makarov, Evgeny Fredovich; Mishin, Konstantin Yakovlevich; and Baltrunas, Daljus Antanas Jono, 4,004,970.

Bamberger, Carlos E.; and Richardson, Donald M., to United States of America, Energy Research and Development Administration. Thermochemical process for the production of hydrogen using chromium and barium compound. 4,005,184, Cl. 423-579.000.

Bamberger, Carlos E.: *See*—
Bennett, Melvin R.; Bamberger, Carlos E.; and Kelmers, A. Donald, 4,005,178.

Banerji, Ranan: *See*—
Joynson, Reuben E.; Mundy, Joseph L.; and Banerji, Ranan, 4,005,385.

Banitt, Elden H.; and Bronn, William R., to Riker Laboratories, Inc. Antiarrhythmic method utilizing fluoroalkoxy-N-piperidyl and pyridyl benzamides. 4,005,209, Cl. 424-267.000.

Barbieri, Joseph C., to W. H. Brady Co. Adhesive wire marker. 4,004,362, Cl. 40-316.000.

Bardenhagen, Dietrich; and Schubert, Bernhard, to Hauni-Werke Korber & Co., KG. Method and machine for the production of hinged-lid packs for groups of cigarettes or the like. 4,004,395, Cl. 53-3.000.

Bargain, Michel, to Rhone-Poulenc S.A. Curing 1,2-epoxy with prepolymer based on polyamines and oligomers possessing imide groups. 4,005,154, Cl. 260-837.00R.

Barker, Michael D.: *See*—
Isaac, Eirlys R.; and Barker, Michael D., 4,004,911.

Barlow, Gordon A., to Marvin Glass & Associates. Bridge accessory for track vehicles. 4,004,765, Cl. 246-118.000.

Barnard & Leas Manufacturing Co. Inc.: *See*—
Stephens, Will R., 4,004,786.

Barr, Irwin R., to AAI Corporation. Solar energy concentrating and collecting arrangement with sun-follower and solar energy sensing power control and method. 4,004,574, Cl. 126-271.000.

Bartholomew, Limited: *See*—
Schreiber, Gerald A., 4,004,809.

Bartl, Herbert: *See*—
Mietzsch, Fritz; Hardt, Dietrich; Serini, Volker; Bartl, Herbert; and Vernaleken, Hugo, 4,005,037.

Barton, Lucian Anthony: *See*—
Ross, Daniel Louis; and Barton, Lucian Anthony, 4,005,437.

Baruch, Pierre; Borel, Joseph; and Monnier, Joel, to Agence Nationale de Valorisation de la Recherche (ANVAR); and Commissariat a l'Energie Atomique. Method for improving the doping of a semiconductor material. 4,004,950, Cl. 148-1.500.

BASF Aktiengesellschaft: *See*—
Gottschalk, Peter; Schoellig, Alfred; and Riedel, Guenther, 4,005,066.
Hjortzberg, Bernhard A., 4,005,473.
Kopke, Helmut; Hartmann, Hans-Joerg; Mayer, Dieter; and Motz, Herbert, 4,005,242.
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Basler Stuckfarberei AG: *See*—
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Battelle Development Corporation: *See*—
Frieling, Donald H.; Talbert, Sherwood G.; and Nathan, Richard A., 4,004,573.
Nathan, Richard A.; Schwerzel, Robert E.; Adelman, Albert H.; and Wyant, Robert E., 4,004,572.
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Bausch & Lomb Incorporated: *See*—
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Baxter Travenol Laboratories, Inc.: *See*—
Christensen, John G.; Hektner, Thomas R.; and Olson, Steven L., 4,004,586.
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Bayer Aktiengesellschaft: *See*—
Aya, Masahiro; Miyamoto, Masao; Fukazawa, Nobuo; and Yamagishi, Masaaki, 4,005,071.
Bohm, Walter; Kritzler, Helmuth; and Neumann, Lutz, 4,005,143.
Buchel, Karl Heinz; Kramer, Wolfgang; Kaspers, Helmut; and Scheinpflug, Hans, 4,005,083.
Dorlars, Alfons; Schellhammer, Carl-Wolfgang; and Wirth, Wolf-Dieter, 4,005,098.
Dunwald, Willi; Lewalter, Jurgen; and Merten, Rudolf, 4,005,056.
Eichenhofer, Kurt-Wilhelm; Schliebs, Reinhard; Brandl, Hermann; and Kohnen, Heinrich, 4,005,179.
Hack, Helmuth; Munz, Ferdinand; Eue, Ludwig; and Schafer, Werner, 4,004,913.
Kishino, Shigeo; Kudamatsu, Akio; and Sumi, Shozo, 4,005,197.
Kolling, Heinrich; Thomas, Herbert; Widdig, Arno; and Wollweber, Hartmund, 4,005,123.
Mietzsch, Fritz; Hardt, Dietrich; Serini, Volker; Bartl, Herbert; and Vernaleken, Hugo, 4,005,037.
Moller, Eike; Meng, Karl; Wehinger, Egbert; and Horstmann, Harald, 4,005,215.
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BBC Brown Boveri & Company Limited: *See*—
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Beard, Colin C.; Edwards, John A.; and Fried, John H., to Syntex (U.S.A.) Inc. 5(6)-Benzene ring substituted benzimidazole-2-carbamate derivatives having anthelmintic activity. 4,005,202, Cl. 424-250.000.

Beard, Wallace F.; Poppler, Jack H.; and Kienlen, Loren C., to Doormaid, Inc. Sliding door closer and method and apparatus for installing the same. 4,004,372, Cl. 49-404.000.

Beaton, Stephen Peter; and Harbourne, David Alan, to Du Pont of Canada Limited. Treatment of lead sulphide. 4,004,921, Cl. 75-77.000.

Beauchemin, Norman J., to Lodding Engineering Corporation. Paper machine drainage foil with wear-resistant insert. 4,004,969, Cl. 162-352.000.

Beaver-Advance Corporation: *See*—
Morris, Ronald G., 4,004,393.

Beaver, William L., to Varian Associates. Signal processor for ultrasonic imaging. 4,005,382, Cl. 340-1.00R.

Beavers, John Andrew, to Borg-Warner Corporation. Cable protector. 4,004,326, Cl. 24-81.0CC.

Beccario, Michael J., to Rockwell International Corporation. Commutated log periodic antenna array for automatic direction finding. 4,005,432, Cl. 343-792.500.

Bechtel International Corporation: *See*—
Maddagiri, Aswath, 4,004,424.

Beck, Alexander F.: *See*—
Popplewell, James M.; Pryor, Michael J.; and Beck, Alexander F., 4,005,003.

Beck, Michael J., to J. I. Case Company. Bolt-on piston assembly. 4,004,499, Cl. 92-257.000.

Becton, Dickinson and Company: *See*—
Burns, James A., 4,004,692.

Bednarczyk, Stanislaw: *See*—
Krol, Leszek; Gierek, Adam; Skoczkowski, Kazimierz; Bednarczyk, Stanislaw; Mandelka, Pawel; Nowak, Teodor; and Krzemien, Eugeniusz, 4,004,790.

Beecham Group Limited: *See*—
Buckle, Derek Richard; and Smith, Harry, 4,005,219.

Beedle, John H., to Kybe Corporation. Mounting for sapphire bladed tool. 4,004,317, Cl. 15-236.00A.

Beffa, Fabio; and Back, Gerhard, to Ciba-Geigy Corporation. Unsymmetrical phenyl azo naphthyl chromium complex dyes. 4,005,065, Cl. 260-145.00A.

Beinhauer, Manfred; and Scharkowitz, Eckhart, to Siemens Aktiengesellschaft. Process and arrangement for representing digital data by binary signals. 4,005,478, Cl. 360-40.000.

Bekker, Gijsbertus A.: *See*—
Groenendaal, Willem; Taubert, Friedrich C.; Naber, Jaap E.; and Bekker, Gijsbertus A., 4,004,885.

Belas, John J.; and Pellatiro, Leonard P., to Bethlehem Steel Corporation. Tunnelized burner for panel type furnace. 4,004,789, Cl. 266-87.000.

Belfer, Warren B., to United States of America, Army. Constant recoil system. 4,004,495, Cl. 89-42.00B.

Belke, Jack T., to Westran Corporation. Landing gear construction. 4,004,830, Cl. 280-763.000.

Bell & Howell Company: *See*—
Filipovich, Danny, 4,005,447.
Gallagher, John A.; and Broderick, Milan A., 4,005,442.

Bell, Stephen William: *See*—
Clifford, David Victor; Bell, Stephen William; Gordon, Stuart; and Jones, Philip Graham, 4,004,523.

Bellamy, John C., II: *See*—
Collins, Arthur A.; Pedersen, Robert D.; and Bellamy, John C., II, 4,005,272.

Bellut, Hans: *See*—
Koster, Roland; and Bellut, Hans, 4,005,132.

Belov, Jury Ivanovich: *See*—
Andronov, Mikhail Alexandrovich; Bakun, Anatoly Nikolaevich; Mezhevich, Felix Evgenievich; Petrov, Mikhail Ivanovich; Belov, Jury Ivanovich; Feldman, Alexandr Yakovlevich, deceased; and Feldman, Raisa Alexandrovna, administratrix, 4,004,616.

Benard, Jack: *See*—
Bonnefon, Alain; and Benard, Jack, 4,005,054.

Bender, Paul E.; and Loev, Bernard, to SmithKline Corporation. N-Heterocyclic-9-xanthenylamines. 4,005,208, Cl. 424-267.000.

Bendix Corporation, The: *See*—
Gongwer, Calvin A., 4,004,308.
Gongwer, Calvin A., 4,004,309.

Bennett, Melvin R.; Bamberger, Carlos E.; and Kelmers, A. Donald, to United States of America, Energy Research and Development Administration. Method for converting UF5 to UF4 in a molten fluoride salt. 4,005,178, Cl. 423-259.000.

Bennett, Robert B., to Dow Chemical Company, The. Method for insulation of curved surfaces. 4,004,394, Cl. 52-741.000.

Beregovoi, Ivan Zakharovich: *See*—
Gavrilov, Anatoly Nikolaevich; Godin, Eduard Moiseevich; Kebets, Leonid Nikolaevich; Beregovoi, Ivan Zakharovich; Matskevich, Vladimir Ivanovich; Korf, Yakov Osherovich; and Dorofeev, Alexandr Grigorievich, 4,004,420.

Berg, Christoph: *See*—
Knothe, Erich; Melcher, Franz Josef; and Berg, Christoph, 4,004,458.

Berg, Samuel Sidney; Jenkins, David Conwil; Martin, George Christopher James; Phillipson, Ronald Frederick; and Thompson, Garth Molesdale, to May & Baker Limited. Treatment of helminth infections with substituted phenyl-thiourea derivatives. 4,005,217, Cl. 424-300.000.

Berger, Robert L.; Hailey, William H.; Mallick, George, Jr.; Mannbeck, Donald H.; and Weight, Wilber J., to Western Electric Company, Inc. Voltage comparator and indicating circuit. 4,005,365, Cl. 324-133.000.

Bergische Stahl-Industrie: *See*—
Rocholl, Hans; and Klein, Willi, 4,004,659.

Bernier, Claude. Anti-skid boat. 4,004,536, Cl. 114-144.00R.

Berns, Charles, to General Signal Corporation. Buzzer construction and method of adjusting the same. 4,005,413, Cl. 340-402.000.

Berry, Arthur E. Adjustably mounted power fishing reel. 4,004,366, Cl. 43-27.400.

Berry, Samuel M.: *See*—
Pierce, William C.; Berry, Samuel M.; and Johnson, Arthur D., 4,004,335.

Besenbruch-Hofmann, Inc.: *See*—
Hinojosa, Carlos R., 4,004,666.

Best, James Jacob: *See*—
Agnew, Mark Charles; Best, James Jacob; and Gudgel, Willard Leon, 4,004,795.

Bethlehem Steel Corporation: *See*—
Belas, John J.; and Pellatiro, Leonard P., 4,004,789.

Kreiger, John W., 4,004,916.
Szendroi, Imre, 4,004,702.
Bezsilko, Nicolas, to S.A. Vandeputte Fils a Cie (department electronique Velec Sefat). Machine for separating pieces of money or similar articles. 4,004,598, Cl. 133-1.00R.
Biblin, Daniel L.; and Preziosi, Joseph R., to Amerace Corporation. Self-sealing, self-locking threaded fastener. 4,004,626, Cl. 151-7.000.
Bickel, Hans; and Kump, Wilhelm, to Ciba-Geigy Corporation. Antibiotically active compounds. 4,005,077, Cl. 260-239.30P.
Bienvenu, Joseph O., to Petrolite Corporation. Isocyanated polyvalent metal salts of oxidized waxes. 4,004,932, Cl. 106-31.000.
Biersdorf Aktiengesellschaft: *See*—
Petersen, Rudolf Theodor; and Fleck, Wolfgang, 4,005,096.
Bigley, William J.: *See*—
Rawicz, Harris C.; Bigley, William J.; Cangiani, Gene L.; and Yohannan, Rene C., 4,004,729.
Billeruds Aktiebolag: *See*—
Swan, Brita; and Gustavsson, Rune, 4,004,967.
Binder, William R. Candle mold. 4,004,773, Cl. 249-93.000.
Bingham, Henry: *See*—
Rees, Gwilym James; and Bingham, Henry, 4,004,645.
Biola, Georges; Fabre, Alain; and Schneider, Gerard, to Rhone-Poulenc Industries. Distillation of propylene oxide from propylene oxidation reaction product in mixture with a phosphoric acid ester. 4,005,114, Cl. 260-348.50L.
Birchall, James Derek; and Cassidy, John Edward, to Imperial Chemical Industries Limited. Solid complex phosphate of aluminum. 4,005,172, Cl. 423-300.000.
Bischeltsrieder, Lorenz, to Stubben GmbH, Riding Equipment. Saddle tree for riding saddles. 4,004,402, Cl. 54-44.000.
Bison-werke Bahre & Greten GmbH & Co. KG: *See*—
Bucking, Gunter, 4,005,162.
Blair, C. Lee, to Raymond Lee Organization, Inc., The, a part interest. Horizontally swingable golf tee. 4,004,814, Cl. 273-204.000.
Blair, Everett George, to Wallace-Murray Corporation. Fan drive secant pumping grooves. 4,004,668, Cl. 192-58.00B.
Blair, Raymond, to International Fence Alarm Corporation. Fence alarm. 4,005,397, Cl. 340-223.000.
Bland, Charles W. Hanger mechanism and sail engaging tool attached to tool bar thereby. 4,004,640, Cl. 172-710.000.
Blauschild, Robert A., to Signetics Corporation. Triple state to binary converter. 4,005,315, Cl. 307-209.000.
Blauth, Gary William: *See*—
Lehr, Stanley; Coralnick, Philmore; and Blauth, Gary William, 4,005,266.
Bloomfield, David P., to United Technologies Corporation. Pressurized fuel cell power plant. 4,004,947, Cl. 429-17.000.
Blum, Rudolf, to Robert Bosch G.m.b.H. Voltage-regulated and overcurrent-protected power supply. 4,005,351, Cl. 321-14.000.
Bodnar, Ernest Robert. Scrap chopper. 4,004,479, Cl. 83-345.000.
Bodson, Fernand Jacques Joseph. Process for the elimination of chloride from zinc sulphate solutions. 4,005,174, Cl. 423-43.000.
Boehringer, John R. Safety interface for anesthesia vacuum scavenging. 4,004,585, Cl. 128-145.800.
Boeing Company, The: *See*—
George, Loyd William, 4,004,736.
Gerstine, Milton I.; Goldberg, Joshua I.; Futatsugi, Setsuo; Ueda, Kazuo; Seo, Ryozo; Iwasaki, Koji; and Uemura, Makoto, 4,004,756.
McAvoy, John Jerome, 4,004,761.
Boenning, Robert A.; and Welden, George R., to Westinghouse Electric Corporation. Probe pin. 4,004,843, Cl. 339-108.0TP.
Boger, Manfred; and Drabek, Jozef, to Ciba-Geigy Corporation. O-(2-vinylphenyl)-thiol-phosphates. 4,005,158, Cl. 260-949.000.
Bohm, Walter; Kritzler, Helmuth; and Neumann, Lutz, to Bayer Aktiengesellschaft. Process for manufacturing aromatic diamines. 4,005,143, Cl. 260-575.000.
Bohn, August C.; and Morse, Glenn B. Snap hook for fishing tackle. 4,004,328, Cl. 24-237.000.
Bokros, Jack C., to General Atomic Company. Carbon bearings via vapor deposition. 4,005,163, Cl. 264-81.000.
Bolton, Ronald A.: *See*—
Meyer, Rolf; Martin, Manuel I.; and Bolton, Ronald A., 4,004,883.
Boltz, Chadwick C.: *See*—
Thomas, William D.; and Boltz, Chadwick C., 4,004,753.
Bondarenko, Alexandr Sergeevich: *See*—
Zverev, Anatoly Ivanovich; Bondarenko, Alexandr Sergeevich; Pudzinsky, Mikhail Antonovich; Sopryazhinsky, Vadim Mikhailovich; and Yakshin, Nikolai Alexeevich, 4,004,735.
Bonnefon, Alain; and Benard, Jack, to Pneumatiques, Caoutchouc Manufacture et Plastiques Kleber-Colombes. Production of polyolefin-reinforced rubber products. 4,005,054, Cl. 260-42.560.
Boone, Philip. Device for positioning a container of supplemental material adjacent to a toilet-tissue holder. 4,004,687, Cl. 206-233.000.
Booth, Jacqueline L. Yarn dispensing apparatus. 4,004,745, Cl. 242-54.00R.
Borel, Joseph: *See*—
Baruch, Pierre; Borel, Joseph; and Monnier, Joel, 4,004,950.
Borg-Warner Corporation: *See*—
Beavers, John Andrew, 4,004,326.
Boriss, Robert P.; and McNamara, Thomas F., to United States of America, Army. Method and apparatus for providing decelerated aircraft approach. 4,004,758, Cl. 244-17.130.
Borrello, Denis, to Foodways National, Inc. Packaging machine. 4,004,399, Cl. 53-180.00M.
Borries, John A., to Cooper Industries, Inc. Air tool with speed responsive shutoff. 4,004,859, Cl. 415-25.000.
Borsi, Jozsef: *See*—
Mago nee Karacsony, Erzsebet; Borsi, Jozsef; Csanyi, Endre; Pik, Katalin; and Wolf, Lajos, 4,005,089.
Boter, Pieter Abraham, to U.S. Philips Corporation. Rechargeable electrochemical cell. 4,004,943, Cl. 429-59.000.
Bottai, Gabriele: *See*—
Calcagno, Benedetto; Piccolo, Luigi; Paolinelli, Antonio; Cozza, Giorgio; and Bottai, Gabriele, 4,005,175.
Botzenhardt, Leonhard, to Licentia Patent-Verwaltungs-G.m.b.H. Contact system for semiconductor arrangement. 4,005,456, Cl. 357-71.000.
Boulanger, Henry J., to Texas Instruments Incorporated. Pushbutton keyboard switch assembly having individual concave-convex contacts integrally attached to conductor strips. 4,005,293, Cl. 200-5.00A.
Boutin, Gilbert R. Conduit connectors. 4,004,831, Cl. 285-81.000.
Boward, James F., Jr. Aerating apparatus. 4,005,015, Cl. 210-220.000.
Boyd, Martin C., to Philadelphia Suburban Corporation. Fire-responsive tank top. 4,004,708, Cl. 220-224.000.
Braasch, Michael: *See*—
Langheim, Franz; and Braasch, Michael, 4,004,880.
Braden, Denver, to Illinois Tool Works Inc. Radial leaded electrical components designed for automatic insertion into printed circuit boards. 4,004,688, Cl. 206-330.000.
Braeutigam, Hans: *See*—
Weidenbach, Guenther; Koepernik, Karl Hermann; and Braeutigam, Hans, 4,005,177.
Brandin, Henry. Word game apparatus. 4,004,811, Cl. 273-135.00D.
Brandl, Hermann: *See*—
Eichenhofer, Kurt-Wilhelm; Schliebs, Reinhard; Brandl, Hermann; and Kohnen, Heinrich, 4,005,179.
Brandt-Pra, Inc.: *See*—
McInerny, George P., 4,004,506.
Braun, Heinz; Dahl, Hans; Hefter, Jost; and Stotz, Wolf-Gunter, to Escher Wyss G.m.b.H. Consecutive multi-ply formers with an unencumbered doffer felt. 4,004,968, Cl. 162-304.000.
Brayley, Elwin J.; Brownlee, Allen L.; and Garen, John C., to Eltra Corporation. Ignition breaker point arrangement. 4,005,294, Cl. 200-19.00A.
Breer, Carl, II. Dispenser and applicator device. 4,004,854, Cl. 401-205.000.
Breitbach, Francis John, to Deere & Company. Snap ring tool. 4,004,338, Cl. 29-229.000.
Breitschwerdt, Werner; and Knoll, Heinz W., to Daimler-Benz Aktiengesellschaft. Device for the rapid disengagement of a retaining system in vehicles. 4,004,821, Cl. 280-744.000.
Brenneisen, Jorg, to BBC Brown Boveri & Company Limited. Arrangement for protection of self-controlled inverter fed from an intermediate d.c. voltage link. 4,005,350, Cl. 321-11.000.
Breslow, Jeffrey D., to Marvin Glass & Associates. Game apparatus with timer-controlled receptacle closure. 4,004,803, Cl. 273-1.00R.
Breton, Henri E.: *See*—
Smola, Frank M.; and Breton, Henri E., 4,004,548.
Bretschneider, Hermann; Klotzer, Wilhelm; Bader, Gunther; and Lutz, August, to Hoffmann-La Roche Inc. Pyrazole-5-carboxamides. 4,005,100, Cl. 260-310.00R.
Breuer, Hermann: *See*—
Miyadera, Tetsuo; Breuer, Hermann; and Treuner, Uwe D., 4,005,081.
Brian, Michael A., to Oxy Metal Industries Corporation. Control system for conveying apparatus. 4,005,349, Cl. 318-569.000.
Brichard, Jean, to Solvay & Cie. Granules of salts of poly-α-hydroxyacrylic acids and a process for their manufacture. 4,005,136, Cl. 260-535.00P.
Bridge, Frank; and Singh, Tej Kuldip, to Associated Paper Mills Limited, The. Apparatus for producing fibrous webs. 4,004,324, Cl. 19-156.300.
Bridgestone Tire Company Limited: *See*—
Takasuga, Yutaka; Nishimura, Seiichiro; and Suzuki, Masayoshi, 4,004,961.
Tsuji, Naotaka; and Yamada, Koji, 4,004,693.
Briggs, Aubrey C., to Dravo Corporation. Material handling apparatus with load compensated counterweight system. 4,004,696, Cl. 212-49.000.
Briggs, George James; Buckler, Ernest Jack; and Wei, Yung-Kang, to Polysar Limited. Polymer-oil-black masterbatch. 4,005,053, Cl. 260-33.6AQ.
Brindisi, Frank A., Jr., to Enthone, Incorporated. Selectively stripping tin or tin-lead alloys from copper substrates. 4,004,956, Cl. 156-666.000.
British Railways Board: *See*—
Shore, Anthony G. L.; Preston, Kevin S.; and Churchill, David A., 4,004,660.
Broderick, Milan A.: *See*—
Gallagher, John A.; and Broderick, Milan A., 4,005,442.
Brongo, Louis Joseph, to Metropolitan Wire Corporation. Mobile truck provided with improved removable racks for pans, trays and the like. 4,004,819, Cl. 280-79.300.
Bronn, William R.: *See*—
Banitt, Elden H.; and Bronn, William R., 4,005,209.
Brooke, Edric R., to Xerox Corporation. Sheet stripping device. 4,004,802, Cl. 271-174.000.
Brooks, John Langshaw; Budziarek, Richard; Crook, James William; and Vickers, Edward Jervis, to Imperial Chemical Industries Limited. Oxyformamidates. 4,005,097, Cl. 260-295.00Q.

Broun, Georges: *See—*
Avrameas, Stratis; Broun, Georges; Selegny, Eric; and Thomas, Daniel, 4,004,979.

Brown, Alfred; Wu, Ching H.; and Konopnicki, Daniel T., to Texaco Inc. Combined multiple solvent and thermal heavy oil recovery. 4,004,636, Cl. 166-272.000.

Brown, Boveri & Cie A. G.: *See—*
Brungsberg, Josef-Heinrich, 4,004,560.

Brown, Edgar D., Jr.; and Traver, Frank J., to General Electric Company. Silicone fluid useful as a brake fluid. 4,005,023, Cl. 252-78.300.

Brown, Jack M., to Esterline Electronics Corporation. Electrically conductive moveable support member for use in electrical switches. 4,005,298, Cl. 200-153.00R.

Brownlee, Allen L.: *See—*
Brayley, Elwin J.; Brownlee, Allen L.; and Garen, John C., 4,005,294.

Brungsberg, Josef-Heinrich, to Brown, Boveri & Cie A. G. Interrupter for the ignition system of internal combustion engines. 4,004,560, Cl. 123-148.00E.

Brunner, Josef Klemens. Water-compatible solvents for film-forming resins and resin solutions made therewith. 4,005,051, Cl. 260-29.40R.

Buchel, Karl Heinz; Kramer, Wolfgang; Kaspers, Helmut; and Scheinpflug, Hans, to Bayer Aktiengesellschaft. Metal complexes of azolyl ethers. 4,005,083, Cl. 424-245.000.

Bucking, Gunter, to Bison-werke Bahre & Greten GmbH & Co. KG. Process for the continuous production of particle board. 4,005,162, Cl. 264-25.000.

Buckle, Derek Richard; and Smith, Harry, to Beecham Group Limited. Pharmaceutical compositions and their administration for the prophylaxis of asthma, hayfever and rhinitis. 4,005,219, Cl. 424-305.000.

Buckler, Ernest Jack: *See—*
Briggs, George James; Buckler, Ernest Jack; and Wei, Yung-Kang, 4,005,053.

Budziarek, Richard: *See—*
Brooks, John Langshaw; Budziarek, Richard; Crook, James William; and Vickers, Edward Jervis, 4,005,097.

Buhler, Fritz: *See—*
Scheuchzer, Fredy; and Buhler, Fritz, 4,004,524.

Bukatarevic, Dragan. Rotary piston internal combustion engine having a heat transfer phase. 4,004,555, Cl. 123-8.050.

Bundy, Gordon L., to Upjohn Company, The. Phenyl-substituted prostaglandin-A type analogs. 4,005,115, Cl. 260-410.90R.

Bunker, Anthony John: *See—*
Sampson, Keith George; Jenkins, Victor Frederick; and Bunker, Anthony John, 4,005,155.

Bunnell, Frederick E., III; and Combs, Henry G., to Lockheed Aircraft Corporation. Articulated high "G" pilot S seat. 4,004,763, Cl. 244-122.00R.

Burdyn, Ralph F.; Chang, Harry L.; and Cook, Evin L., to Mobil Oil Corporation. Oil recovery by alkaline-surfactant waterflooding. 4,004,638, Cl. 166-273.000.

Burgdorf, Jochen, to ITT Industries, Inc. Dual circuit brake force regulating device. 4,004,839, Cl. 303-6.00C.

Burklund, Vernon D.; Stone, W. James; and Schmidt, Joseph A., to United States of America, Navy. Drogue chute extraction. 4,004,764, Cl. 244-149.000.

Burlington Industries, Inc.: *See—*
London, Joe F., Jr.; and Lauber, Jean-Louis, 4,004,329.

Burnell, Dennis G. A., to Chandler Evans Inc. Gas turbine engine fuel metering system. 4,004,412, Cl. 60-39.28R.

Burnett, Jesse A.: *See—*
Jatczak, Chester F.; Burnett, Jesse A.; and Mohr, Terry W., 4,004,952.

Burns, Donald A., to Technicon Instruments Corporation. Automated timing of fluid delivery in sample analysis. 4,004,451, Cl. 73-23.000.

Burns, James A., to Becton, Dickinson and Company. Cot dispenser. 4,004,692, Cl. 206-486.000.

Burroughs Corporation: *See—*
Lundquist, David E.; Hoffman, Paul R.; Su, Chauchang; Sung, Benjamin T.; and Eichhardt, Steven A., 4,005,435.
MacPherson, Alastair George, 4,005,391.

Burroughs Wellcome Co.: *See—*
Stickney, Dwight R.; Simmons, William S.; Nichol, Charles A.; Hitchings, George H.; and Elion, Gertrude B., 4,005,203.
Stickney, Dwight R.; Simmons, William S.; Nichol, Charles A.; Hitchings, George H.; and Elion, Gertrude B., 4,005,204.

Burzlaff, Karl H.; and Sanchez, Carmelo, to Singer Company, The. Wire matrix printhead having facility for enabling wirewear correction. 4,004,673, Cl. 197-1.00R.

Busch, Albert E. Weighing system. 4,004,646, Cl. 177-1.000.

BUSS Aktiengesellschaft: *See—*
Ronner, Fritz, 4,004,788.

Butler, Tony W., Jr. Energy conversion system. 4,004,427, Cl. 60-698.000.

Butts, Gene A.: *See—*
Golias, Tipton L.; and Butts, Gene A., 4,005,434.

B.V. Korthofah: *See—*
de Groot, Jacobus Henricus, 4,004,511.

Byrne, James Donald; and Griffith, Paul Arthur, to Monitor Labs, Incorporated. Gas analysis diluter. 4,004,882, Cl. 23-254.00R.

Byrnes, Robert M., Sr. Protective glove constructed of flexible strands of metal wire and fiber yarn. 4,004,295, Cl. 2-161.00R.

Cabot Corporation: *See—*
Harris, Howard R., 4,005,170.
Tully, Paul Raymond, 4,004,368.

Calabek, Milan: *See—*
Sandera, Josef; Calabek, Milan; Cenek, Miroslav; Koudelka, Vojtech; Kouril, Oldrich; Malik, Jiri; and Vanacek, Josef, 4,004,944.

Calcagno, Benedetto; Piccolo, Luigi; Paolinelli, Antonio; Cozza, Giorgio; and Bottai, Gabriele, to Societa' Italiana Resine S.I.R. S.p.A. Process for the joint production of sodium tripolyphosphate and titanium dioxide. 4,005,175, Cl. 423-83.000.

Calistrat, Michael M., to Koppers Company, Inc. Continuously lubricated coupling. 4,004,433, Cl. 64-9.00R.

Calori, Giovanni: *See—*
Tangorra, Giorgio; and Calori, Giovanni, 4,004,628.

Campanaro, Thomas J.; and Marino, Douglas E. Isotonic exercise unit. 4,004,801, Cl. 272-120.000.

Campbell, Norman: *See—*
Dix, Joseph; Campbell, Norman; and Tonseth, Ivar Scott, Jr., 4,004,490.

Canell, George; and Schotz, Larry A., to Lynn Industries. Solid state echo producing system. 4,005,268, Cl. 179-1.00J.

Cangiani, Gene L.: *See—*
Rawicz, Harris C.; Bigley, William J.; Cangiani, Gene L.; and Yohannan, Rene C., 4,004,729.

Cannon, Robert T.: *See—*
Gerber, Melvin N.; Cannon, Robert T.; and Penn, Mitchell E., 4,004,517.

Canon Kabushiki Kaisha: *See—*
Hirano, Reiji; Hanakata, Takayoshi; and Ito, Matsutoshi, 4,004,672.
Ito, Yoshio; Kitajima, Tadayuki; and Touyama, Yoshikuni, 4,004,714.
Okuno, Youichi, 4,005,458.
Seki, Mitsuaki; and Nakazawa, Tamotu, 4,005,386.
Uchiyama, Takashi; Mashimo, Yukio; Taguchi, Tetsuya; and Nakamura, Zenzo, 4,005,444.

Capra, Uberto, to Ceccato & C. S.p.A. Scrubbing unit for vehicle-washing station. 4,004,313, Cl. 15-53.0AB.

Captocap Limited: *See—*
Hilaire, Fernand, 4,004,704.

Carl Brehmer & Sohn: *See—*
Saphir, Johannes R., 4,004,877.

Carleton, John T., to United States of America, Energy Research and Development Administration. Neutronic reactor. 4,004,973, Cl. 176-84.000.

Carlson, Carl V., to R & D Constructors, Inc. Hangar facility. 4,004,382, Cl. 52-64.000.

Carlstrom, Borge Ingmar: *See—*
Guldenfels, Willi; and Carlstrom, Borge Ingmar, 4,004,706.

Carson, Earl W. Flush valve. 4,004,606, Cl. 137-271.000.

Cartabbia, Giovanni. Ironing machine for ironing collars and lapels of clothing goods. 4,004,720, Cl. 223-57.000.

Casella, Daniel C., to GTE Sylvania Incorporated. High intensity discharge lamp starting circuit. 4,005,336, Cl. 315-239.000.

Cassidy, John Edward: *See—*
Birchall, James Derek; and Cassidy, John Edward, 4,005,172.

Castagna, Gerald. Scratch preventer. 4,004,379, Cl. 51-274.000.

Castonguay, Leon H., to Astratronics, Inc. Bow string release. 4,004,564, Cl. 124-35.00A.

Castro, Fernando; and O'Day, Richard Lewis, to International Business Machines Corporation. Asymmetric erase across a rotary transformer to a rotating magnetic head. 4,005,482, Cl. 360-66.000.

Caterina, Fred J.: *See—*
Joseph, Craig L.; Caterina, Fred J.; and Cremer, Hans H., 4,004,648.

Caterpillar Tractor Co.: *See—*
Chaney, Elwood; and Crayton, John W., 4,005,308.
Flesburg, Edward E., 4,004,779.
Gale, Preston Lee; and Roberts, James L., 4,004,889.
Guhl, Richard E.; and Oswald, Charles W., 4,004,665.
Hendrickson, Vergil P., 4,004,641.
Keske, Frank E., 4,004,471.
Nerstad, Karl A.; Koch, Franklin O., Jr.; and Chadwick, Curtis E., III, 4,004,670.
Pearce, Shairyl I.; Ireland, Gerald B.; and Windish, Willis E., 4,004,473.
Woody, Albert L.; Audiffred, Sidney J.; and Steury, Howard C., 4,004,417.

Cavitt, Roy L.: *See—*
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Ceccato & C. S.p.A.: *See—*
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Celanese Canada Limited: *See—*
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Celanese Corporation: *See—*
Chenevey, Edward C.; and Hanson, Harry T., 4,005,058.

Cenek, Miroslav: *See—*
Sandera, Josef; Calabek, Milan; Cenek, Miroslav; Koudelka, Vojtech; Kouril, Oldrich; Malik, Jiri; and Vanacek, Josef, 4,004,944.

Central Electricity Generating Board: *See—*
Freck, David Vernon; and Hall, John Anthony, 4,004,971.

Cerco Tires Inc.: *See—*
Hill, Billy R., 4,004,862.

Cerefice, Steven A.; and Fields, Ellis K., to Standard Oil Company (Indiana). Polyhalo poly cyclocarboxylic acid compounds. 4,005,122, Cl. 260-468.00G.

Cerny, Antonin: *See—*
Semonsky, Miroslav; Cerny, Antonin; Nemecek, Oldrich; Rezabek, Karel; Seda, Miroslav; Trcka, Vaclav; and Grimova, Jaroslava, 4,005,090.

Ceskoslovenska akademie ved: *See—*
Sorm, Frantisek; Svoboda, Miroslav; Zavada, Jiri; Slama, Karel; and Arnold, Zdenek, 4,005,150.

Chadwick, Curtis E., III: *See—*
Nerstad, Karl A.; Koch, Franklin O., Jr.; and Chadwick, Curtis E., III, 4,004,670.

Chaffee, Robert C.: *See—*
Sanneman, Douglas D.; Stalder, Ernest; and Chaffee, Robert C., 4,004,351.

Chalov, Vladimir Pavlovich: *See—*
Kabanov, Nikolai Pavlovich; Schukin, Vitaly Sergeevich; Knyazev, Jury Alexeevich; Makhalov, Sergei Fedorovich; Popov, Mikhail Ivanovich; Savonichev, Dmitry Nikolaevich; Shepelev, Dmitry Nikolaevich; Suvorov, Vladimir Nikolaevich; and Chalov, Vladimir Pavlovich, 4,004,723.

Chambers, John E.: *See—*
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Champion International Corporation: *See—*
Georgeau, Phillip Carl; and Winebrenner, Lester I., 4,005,033.
Moses, Daniel H., 4,004,701.

Champion Spark Plug Company: *See—*
Stewart, Ronald K.; and Insley, Robert H., 4,005,050.

Champlin Petroleum Company: *See—*
Stender, Carl H., 4,004,776.

Chandler Evans Inc.: *See—*
Burnell, Dennis G. A., 4,004,412.

Chandra, Grish; and Griffiths, Brian John, to Dow Corning Limited. Catalysts and carriers therefor. 4,005,046, Cl. 252-428.000.

Chaney, Elwood; and Crayton, John W., to Caterpillar Tractor Co. Weld fill height regulating system for arc welding apparatus. 4,005,308, Cl. 219-125.00R.

Chang, Augustine Wei-Chun; and Lucarini, Vincent Joseph, to International Business Machines Corporation. P-type-epitaxial-base transistor with base-collector Schottky diode clamp. 4,005,469, Cl. 357-15.000.

Chang, Chau-Ting, to Institute of Nuclear Energy Research. Method for the preparation of rare and precious metals by electrolytical amalgamation using ion exchange membrane. 4,004,987, Cl. 204-1.500.

Chang, Harry L.: *See—*
Burdyn, Ralph F.; Chang, Harry L.; and Cook, Evin L., 4,004,638.

Chapiro, Adolphe; and Mankowski, Zbigniew, to Agence Nationale de Valorisation de la Recherche (ANVAR). Copolymer of N-vinylcarbazole. 4,005,059, Cl. 526-259.000.

Charles Beseler Company: *See—*
Kowalski, Charles J., 4,005,463.

Chatigny, Raymond E., to Harrington & Richardson, Inc. Rotatably mounted sear. 4,004,364, Cl. 42-69.00A.

Chauvin, Yves; Commereuc, Dominique; Cruypelinck, Daniel; and Soufflet, Jean-Pierre, to Institut Francais du Petrole. Catalytic composition and its use for polymerizing cycloolefins. 4,005,047, Cl. 252-429.00R.

Chemische Werke Huls Aktiengesellschaft: *See—*
Langheim, Franz; and Braasch, Michael, 4,004,880.
List, Ferdinand; Uhlenbrock, Wilfried; Wilke, Norbert; and Wember, Kurt, 4,005,124.
Magosch, Karl-Heinz; and Ruter, Jorn, 4,004,878.

Chen, Bertha L.: *See—*
Chen, Kun-Mu; and Chen, Bertha L., 4,004,805.

Chen, Kun-Mu; and Chen, Bertha L. Electronic line monitoring system for a tennis court. 4,004,805, Cl. 273-29.00R.

Chenevey, Edward C.; and Hanson, Harry T., to Celanese Corporation. Process for the formation and recovery of poly(bisbenzimidazoenzophenanthroline). 4,005,058, Cl. 260-78.410.

Chernyshev, Vladimir Ivanovich: *See—*
Chumakov, Mikhail Petrovich; Prokhorova, Inna Alexandrovna; Grachev, Viktor Pavlovich; Petukhova, Valentina Vasilievna; Svezhinina, Julia Anatolievna; Mironova, Ljubov Leonidovna; Ralf, Ninel Mikhailovna; Popova, Valentina Dmitrievna; Mustafina, Aida Nurislamovna; and Chernyshev, Vladimir Ivanovich, 4,004,974.

Chevron Research Company: *See—*
De Vries, Louis, 4,005,072.
Stayner, Robert A., 4,005,304.

Chihara, Yasuaki: *See—*
Muro, Tomio; Chihara, Yasuaki; Fukuzawa, Sogo; Ogawa, Kiyoshi; and Nakanishi, Akira, 4,005,084.

Chilton, Dennis J., to Zentil, Joseph. Pipe hanger. 4,004,767, Cl. 248-58.000.

Chodnekar, Madhukar Subraya, to Hoffmann-La Roche Inc. Phenyl carbamate. 4,005,216, Cl. 424-282.000.

Christensen, John G.; Hektner, Thomas R.; and Olson, Steven L., to Baxter Travenol Laboratories, Inc. Method and apparatus for sealed, sterile connection. 4,004,586, Cl. 128-214.00D.

Chumakov, Mikhail Petrovich; Prokhorova, Inna Alexandrovna; Grachev, Viktor Pavlovich; Petukhova, Valentina Vasilievna; Svezhinina, Julia Anatolievna; Mironova, Ljubov Leonidovna; Ralf, Ninel Mikhailovna; Popova, Valentina Dmitrievna; Mustafina, Aida Nurislamovna; and Chernyshev, Vladimir Ivanovich. Live virus culture vaccine against carnivore distemper and method of producing same. 4,004,974, Cl. 195-1.300.

Churchill, David A.: *See—*
Shore, Anthony G. L.; Preston, Kevin S.; and Churchill, David A., 4,004,660.

Ciba-Geigy AG: *See—*
Toepfl, Werner, 4,004,914.

Ciba-Geigy Corporation: *See—*
Beffa, Fabio; and Back, Gerhard, 4,005,065.
Bickel, Hans; and Kump, Wilhelm, 4,005,077.
Boger, Manfred; and Drabek, Jozef, 4,005,158.
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Foery, Werner; and Fischer, Hans Peter, 4,004,909.
Foery, Werner; and Fischer, Hans Peter, 4,004,910.
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Schmid, Wolfgang, 4,004,907.

Clad Metals, Inc.: *See—*Ulan, John B., 4,004,892.

Claiborne, Lewis T., Jr., to Texas Instruments Incorporated. Elastic wave detector. 4,005,318, Cl. 307-304.000.

Clark, Mary G. Topical ointment composition. 4,005,191, Cl. 424-154.000.

Clearman, Jack F.: *See—*
Corn, Adolph Duane; and Clearman, Jack F., 4,004,600.

Cleaveland, Charles M., to Westinghouse Electric Corporation. Vacuum-type circuit interrupters having heat-dissipating devices associated with the contact structures thereof. 4,005,297, Cl. 200-144.00B.

Clewett, Merle E.; and Henig, Seymour, to American Chain & Cable Company, Inc. Tilting tray sorting system. 4,004,681, Cl. 198-796.000.

Clifford, David Victor; Bell, Stephen William; Gordon, Stuart; and Jones, Philip Graham. Solid propellant charges. 4,004,523, Cl. 102-103.000.

Codding, Harold E.: *See—*
Pyzel, Ewald D.; and Codding, Harold E., 4,004,823.

Coenders, Johannes Wilhelmus: *See—*
Verhoeckx, Nicolaas Alphonsus Maria; van der Hoff, Herman; Vos, Cornelis Henricus Johannes; and Coenders, Johannes Wilhelmus, 4,005,265.

Cofer, Frank H., Jr.: *See—*
Walker, Walter P.; Smith, Leary W.; Cofer, Frank H., Jr.; and Lewis, Jack E., 4,005,491.

Coffey, Ronald B.: *See—*
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Colebourne, Neville; Rolfe, Nicholas; and McAloon, Kevin Thomas, to Imperial Chemical Industries Limited. Coatings of metal phosphates on metals or glass. 4,005,232, Cl. 428-35.000.

Collet, Pierre Jacques, to U.S. Philips Corporation. Device for adjusting the distance between the objective and the pick-up tube in a television camera. 4,005,263, Cl. 358-227.000.

Colligan, John B.: *See—*
Eschbach, Robert C.; and Colligan, John B., 4,004,373.

Collins, Arthur A.; Pedersen, Robert D.; and Bellamy, John C., II, to Arthur A. Collins, Inc. Time folded TST (time space time) switch. 4,005,272, Cl. 179-15.0AQ.

Collins, John D., to Raytheon Company. Frequency spectrum analyzer. 4,005,417, Cl. 343-5.0SA.

Combs, Henry G.: *See—*
Bunnell, Frederick E., III; and Combs, Henry G., 4,004,763.

Combustion Engineering, Inc.: *See—*
Overby, Clarence Winfred, 4,005,306.

Comer, William Timmey: *See—*
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Commereuc, Dominique: *See—*
Chauvin, Yves; Commereuc, Dominique; Cruypelinck, Daniel; and Soufflet, Jean-Pierre, 4,005,047.

Commissariat a l'Energie Atomique: *See—*
Baruch, Pierre; Borel, Joseph; and Monnier, Joel, 4,004,950.
Gavinet, Jean; and Segurens, Louis, 4,004,443.

Comninellis, Christos: *See—*
Plattner, Eric; and Comninellis, Christos, 4,005,138.

Compagnie Honeywell Bull (Societe Anonyme): *See—*
Magnenet, Jean Georges, 4,004,505.

Compagnie Royale Asturienne des Mines: *See—*
Lemaire, Gilbert, 4,005,061.

Computer Peripherals, Inc.: *See—*
Kaufholz, Frank H., Jr., 4,005,492.

Comtelco (U.K.) Limited: *See—*
Hill, John; and Turczanki, Henry, 4,004,337.

Connelly, Eugene B., to United States Steel Corporation. Thread form for pipe joints. 4,004,832, Cl. 285-333.000.

Connon, Frederick Louis; and Stone, John Neil, to David Krofchak Limited. Method and apparatus for discharge handling of metal sheets. 4,004,699, Cl. 214-6.00C.

Continental Can Company, Inc.: *See—*
Rarey, Kenneth W.; and Kennedy, John B., Jr., 4,004,508.
Walter, John, 4,004,530.

Contraves AG: *See—*
Gahwiler, Hermann; and Schlaepfer, Hansjorg, 4,004,576.

Control Data Corporation: *See—*
Hunnicutt, Roger; and Keel, Beat G., 4,005,479.

Cook, Charles R., Jr., to International Telephone and Telegraph Corporation. Method for providing electrical isolating material in selected regions of a semiconductive material and the product produced thereby. 4,005,452, Cl. 357-49.000.

Cook, Evin L.: *See—*
Burdyn, Ralph F.; Chang, Harry L.; and Cook, Evin L., 4,004,638.

Cook, Newell C.; and Davis, Gary C., to General Electric Company. Process for making 4-nitro-n-methylphthalimide. 4,005,102, Cl. 260-326.00N.

Cook, Paul A., to Recognition Equipment Incorporated. Nose attachment for OCR wand. 4,005,287, Cl. 250-239.000.

Cooper Industries, Inc.: *See—*
Borries, John A., 4,004,859.

Coppock, Richard A., to GTE Sylvania Incorporated. Wideband analog photorecording apparatus and method. 4,005,275, Cl. 179-100.30G.

Coralnick, Philmore: *See—*
Lehr, Stanley; Coralnick, Philmore; and Blauth, Gary William, 4,005,266.

Cordis, Gladys S., executrix: *See—*
Cordis, Nat, deceased; and Cordis, Gladys S., executrix, 4,004,602.

Cordis, Nat, deceased; and by Cordis, Gladys S., executrix, to Jensen, Carl F.; and Dobie, Gerald T., part interest to each. Self-metering dual proportioner. 4,004,602, Cl. 137-99.000.

Cormier, Claude, to Celanese Canada Limited. Pigmentation of polymers. 4,004,940, Cl. 106-308.00M.

Corn, Adolph Duane; and Clearman, Jack F., to Whirlpool Corporation. Dishwasher with special low washing liquid usage cycle. 4,004,600, Cl. 134-57.00D.

Corporate Foods Limited: *See—*
Kortschot, Cornelis; and Miller, James Joseph, 4,005,139.

Costanza, Vincent. Bullet proof garment. 4,004,493, Cl. 89-36.00A.

Costello, Matthew Joseph: *See—*
Krallinger, Robert E.; Ignatjev, Vladimir; Rand, Ralph K.; and Costello, Matthew Joseph, 4,005,257.

Court, William A.: *See—*
Kupchan, S. Morris; and Court, William A., 4,005,108.

Cowans, Kenneth W., to Ketobi Associates. Fluid engine. 4,004,421, Cl. 60-516.000.

Cox, Mary V.; and Widner, Rayburn K., to United States of America, Army. High-speed, high-G air bearing optical mount for Rosette scan generator. 4,004,754, Cl. 244-3.160.

Cox, Zesely B. T. Manually operated propelling apparatus for a boat. 4,004,543, Cl. 115-24.000.

Cozza, Giorgio: *See—*
Calcagno, Benedetto; Piccolo, Luigi; Paolinelli, Antonio; Cozza, Giorgio; and Bottai, Gabriele, 4,005,175.

Craig, Theodore W.; Lopez, Juan; and Henika, Richard G., to Patent Technology Inc. Bakery process and developer composition therefor. 4,005,225, Cl. 426-21.000.

Cramer, Gerhardt H., to Prab Conveyors, Inc. Crusher and material sensor. 4,004,739, Cl. 241-34.000.

Crayton, John W.: *See—*
Chaney, Elwood; and Crayton, John W., 4,005,308.

CRC-Crose International, Inc.: *See—*
Nelson, Jerome W.; Miller, Ford S.; and Randolph, James B., 4,005,305.

Cremer, Hans H.: *See—*
Joseph, Craig L.; Caterina, Fred J.; and Cremer, Hans H., 4,004,648.

Cricchio, Renato; and Lancini, Giancarlo, to Gruppo Lepetit S.p.A. Hydrazones of 3-formylrifamycin SV. 4,005,076, Cl. 260-239.30P.

Crisci, Victor Eugene, to Mammoth Plastics, Inc. Container and closure therefor. 4,004,710, Cl. 220-306.000.

Cronert, Wolfgang, to Martin & Pagenstecher GmbH. Brick construction for horizontal regenerator. 4,004,633, Cl. 165-9.100.

Crook, James William: *See—*
Brooks, John Langshaw; Budziarek, Richard; Crook, James William; and Vickers, Edward Jervis, 4,005,097.

Crounse, Nathan N.: *See—*
Heath, James C.; Werner, Raymond E.; Delaney, John W.; and Crounse, Nathan N., 4,005,026.

Crowell, Ernest M., to USM Corporation. Copolyester-amide resin and adhesive processes. 4,004,960, Cl. 156-331.000.

Cruypelinck, Daniel: *See—*
Chauvin, Yves; Commereuc, Dominique; Cruypelinck, Daniel; and Soufflet, Jean-Pierre, 4,005,047.

Csanyi, Endre: *See—*
Mago nee Karacsony, Erzsebet; Borsi, Jozsef; Csanyi, Endre; Pik, Katalin; and Wolf, Lajos, 4,005,089.

Cumbers, David Charles, to Imperial Chemical Industries Limited. Non-woven fabrics. 4,005,169, Cl. 264-103.000.

Cumings, Francis J.; and Kevorkian, Victor, to Ingersoll-Rand Research, Inc. Methods for molding coal and like material. 4,004,893, Cl. 44-10.00H.

Curoco: *See—*
Hood, Murray C., 4,004,384.

Current Industries, Inc.: *See—*
Horowitz, Victor, 4,005,331.

Curtis, Michel Georges August: *See—*
Marquaire, Roger Andre Marie; Curtis, Michel Georges August; and Schappel, Robert Edouard, 4,004,635.

Cutler-Hammer, Inc.: *See—*
Piber, Earl T., 4,005,300.
White, Warren D., 4,005,426.

Dada, Abdul Gaffar, to General Electric Company. Process for producing uranium rich compositions from uranium hexafluoride using fluid injection in the post oxidation step. 4,005,042, Cl. 252-301.10R.

Dahl, Hans: *See—*
Braun, Heinz; Dahl, Hans; Hefter, Jost; and Stotz, Wolf-Gunter, 4,004,968.

Daicel, Ltd.: *See—*
Morinaga, Tsuyoshi; Nakazawa, Yuji; Arimoto, Kyozo; Takahashi, Katuhiko; and Arai, Yoshiyuki, 4,005,107.

Daimler-Benz Aktiengesellschaft: *See—*
Breitschwerdt, Werner; and Knoll, Heinz W., 4,004,821.

Dale Electronics, Inc.: *See—*
Klug, Robert F., 4,005,381.

Dalgleish, Jack Frank; and Lukas, Helmut Hans, to Northern Telecom Limited. Tool for preforming a section of a tubular connector. 4,004,446, Cl. 72-400.000.

Daman, Lloyd W.; Hille, Earl A.; and Shamp, Donald E., to Libbey-Owens-Ford Company. Method of and apparatus for increasing the melting rate of glass making materials. 4,004,903, Cl. 65-135.000.

Dan River, Incorporated: *See—*
Darchuk, Walter, 4,004,405.

Danfoss A/S: *See—*
Ohrberg, Carl Verner, 4,004,866.

Daniels, Dennis, to U.S. Amada, Ltd. Punching, contouring, handling apparatuses and method. 4,004,333, Cl. 29-38.00C.

Daniels, Peter, to United States of America, Navy. Roll rate stabilized wrap around missile fins. 4,004,514, Cl. 102-3.000.

Dano, Arnold Vincent, to Motorola, Inc. Mobile transceiver housing assembly. 4,005,367, Cl. 325-352.000.

Darchuk, Walter, to Dan River, Incorporated. Flame resistant, thermally stable polyvinyl chloride-polyester blends. 4,004,405, Cl. 57-140.0BY.

Dardick, David. Tround terra-drill processes and apparatus. 4,004,642, Cl. 175-4.500.

Darwood, James R., to T.A.D. Avanti, Inc. Remote control for operating a telephone answering system from a remote point over the telephone line. 4,005,270, Cl. 179-6.00E.

Das, Santosh K.: *See—*
Kaminsky, Manfred S.; Das, Santosh K.; and Rossing, Thomas D., 4,004,890.

Data Diagnostic Corporation: *See—*
Kilthau, Gustave F.; and Loftin, Diana R., 4,005,187.

Data General Corporation: *See—*
West, Joseph Thomas, 4,005,405.

Davajan, Val: *See—*
Nakamura, Robert M.; and Davajan, Val, 4,004,582.

David Krofchak Limited: *See—*
Connon, Frederick Louis; and Stone, John Neil, 4,004,699.

Davis, Gary C.: *See—*
Cook, Newell C.; and Davis, Gary C., 4,005,102.

Davis, Kenneth L., to United States of America, Navy. Electronically variable surface acoustic wave phase shifter. 4,005,376, Cl. 333-30.00R.

Davis, Miles, to Xerox Corporation. Roll fuser. 4,004,549, Cl. 118-60.000.

Davis, Walter Thomas; and Kelly, Peter Bernard, to Formica Corporation. Decorative laminated panel and process for preparing the same. 4,005,239, Cl. 428-315.000.

Davis, William Folsom, to Motorola, Inc. Integrated circuit overvoltage protection circuit. 4,005,342, Cl. 317-16.000.

Dawson, Robert Herman, to RCA Corporation. Planar voltage variable tuning capacitors. 4,005,466, Cl. 357-14.000.

Dax, Peter R., to Westinghouse Electric Corporation. Monopulse radar system and method for improved low elevation tracking. 4,005,421, Cl. 343-16.00M.

De Beers Industrial Diamond Division Limited: *See—*
Greenhalgh, Geoffrey Harvey; Wedlake, Roger John; and DeJager, Pieter Willem Gideon, 4,005,180.

Deaver, Dann T., to Tecnik International Corporation. Composition for reinforced and filled high density rigid polyurethane foam products and method of making same. 4,005,035, Cl. 260-2.5AK.

Debarre, Francois; Jeanmart, Claude; and Simon, Pierre Edouard, to Rhone-Poulenc S.A. Imidazo[2,1-b]thiazole derivatives. 4,005,212, Cl. 424-270.000.

Dedo, Richard G. Respiratory assist device. 4,004,579, Cl. 128-28.000.

Deere & Company: *See—*
Breitbach, Francis John, 4,004,338.
Mott, Roger Eugene, 4,004,436.
Stecklein, Gary Lee, 4,004,855.
VanGerpen, Harlan Welbert, 4,004,418.

Deffeyes, Robert J.; and Tyler, Wesley R., to Graham Magnetics Incorporated. Acicular metallic powders produced from the organometallic salts. 4,004,917, Cl. 75-.5AA.

de Groot, Jacobus Henricus, to B.V. Korthofah. Printing apparatus. 4,004,511, Cl. 101-334.000.

Deinlein-Kalb, Hans. Method of and apparatus for draining condensate from a steam-containing system. 4,004,604, Cl. 137-183.000.

DeJager, Pieter Willem Gideon: *See—*
Greenhalgh, Geoffrey Harvey; Wedlake, Roger John; and DeJager, Pieter Willem Gideon, 4,005,180.

Delaney, John W.: *See—*
Heath, James C.; Werner, Raymond E.; Delaney, John W.; and Crounse, Nathan N., 4,005,026.

Del Grande, Nancy Kerr, to United States of America, Energy Research and Development Administration. Method for identifying anomalous terrestrial heat flows. 4,005,289, Cl. 250-253.000.

De Mets, Albert, to Konstruktiewerkhuizen DeMets N.V. Continuously operating press. 4,004,873, Cl. 425-335.000.

Demkovich, Gary Michael: *See—*
Spicer, Larry Dean; Pensack, Joseph Michael; Wilbur, Robert Daniel; and Demkovich, Gary Michael, 4,005,140.

Denker, Stanley D., to Domain Industries, Inc. Band wheels and drive therefor in band sealer. 4,004,963, Cl. 156-583.000.

Dennison Manufacturing Company: *See—*
Nunzio, Napoleone; and Musgrave, Donald James, 4,005,280.

De Ruggieri, Pietro; and Sighinolfi, Orazio, to Farmila Farmaceutici Milano S.p.A. Tetrahydropyranyl ethers of estrogens. 4,005,079, Cl. 260-239.55D.

DeSoto, Inc.: *See—*
Sekmakas, Kazys, 4,005,052.

Despas, Bernard, to Societe d'Estampage et de Forge Ardennes Champagne-Sefac. Hydraulic tensioning device. 4,004,777, Cl. 254-51.000.

Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See—*
Isaac, Otto, 4,004,976.

De Vries, Louis, to Chevron Research Company. Oil-soluble aziridinyl urea compounds as lubricating oil detergents. 4,005,072, Cl. 260-239.00E.

DeVrou, Kenneth L. Socket wrench extension grip. 4,004,476, Cl. 81-177.00A.

Dhondt, Roland O.: *See—*
Jennings, Don C.; and Dhondt, Roland O., 4,004,982.

Diamond Crystal Salt Company: *See—*
Hoffman, Louis S.; Patel, Navinchandra J.; and Flibotte, George A., 4,004,397.

Dickopp, Gerhard; Oertel, Lothar; and Frey, Wolfgang, to Licentia Patent-Verwaltungs-G.m.b.H. Circuit for compensating time errors in a television signal, particularly from a recording instrument. 4,005,476, Cl. 360-36.000.

DIEHL: *See—*
Sackenreuter, Hans; and Politzer, Anton, 4,004,363.

Dietrich, Heinz J.; and Steiger, Edward L., to Owens-Illinois, Inc. Liquid crystal or mesomorphic 4-methoxyalkoxy-4'-alkyl azoxybenzene compounds. 4,005,064, Cl. 260-143.000.

Dietz, Robert E.: *See—*
Williams, Roger A.; and Dietz, Robert E., 4,004,715.

DiFazio, Joseph, to Acorn Building Components, Inc. Glazing adaptor. 4,004,389, Cl. 52-398.000.

Diffenderfer, Harold C. Concrete and liner retainer coping. 4,004,386, Cl. 52-300.000.

Dinges, Richard A.; and Weber, Morris, to United States of America, Air Force. Optical window protective shutter mechanism. 4,004,465, Cl. 74-84.00R.

DiPasquale, Renato: *See—*
Schiffer, Stephen F.; and DiPasquale, Renato, 4,005,246.

Distler, Edward C., to Reichhold Chemicals, Inc. Machine for preparing orthopedic cast-making materials. 4,004,784, Cl. 259-72.000.

Dix, Joseph; Campbell, Norman; and Tonseth, Ivar Scott, Jr., to General Electric Company. Structure for article handling systems. 4,004,490, Cl. 89-33.00D.

Dixon, Charles C.: *See—*
Uptegraff, Roy E., Jr.; Dixon, Charles C.; and Rahangdale, Ravindra N., 4,005,341.

Dobie, Gerald T.: *See—*
Cordis, Nat, deceased; and Cordis, Gladys S., executrix, 4,004,602.

Dobkin, Robert C., to National Semiconductor Corporation. Temperature transducer. 4,004,462, Cl. 73-362.00R.

Dr. C. Otto & Comp. G.m.b.H.: *See—*
Haese, Egon; and Moll, Hans, 4,005,016.
Haese, Egon, 4,005,045.
Pries, Erich, 4,004,983.

Dr. -Ing. Rudolf Hell GmbH: *See—*
Knop, Hans-Georg, 4,005,475.

Doi, Kazumi: *See—*
Ikeda, Yoshi; Osada, Kenji; and Doi, Kazumi, 4,004,865.

Dolenga, Arthur; and Hill, John C., to General Motors Corporation. Tungsten-fluorine lamp with native retained oxygen therein and method of manufacture. 4,005,324, Cl. 313-222.000.

Domain Industries, Inc.: *See—*
Denker, Stanley D., 4,004,963.

Doman, Glidden S., to Gallagher, William. Oscillation damper for the hub of a rotorcraft rotor and its combination with a rotorcraft. 4,004,757, Cl. 244-17.130.

Doormaid, Inc.: *See—*
Beard, Wallace F.; Poppler, Jack H.; and Kienlen, Loren C., 4,004,372.

Dore, Jacky, to Sandoz Ltd. Process for the synthesis of nitrite ion-containing 1:1 complexes of cobalt and metallizable monoazo or azomethine compounds and such complexes. 4,005,067, Cl. 260-151.000.

Dorlars, Alfons; Schellhammer, Carl-Wolfgang; and Wirth, Wolf-Dieter, to Bayer Aktiengesellschaft. Triazolyl-coumarins. 4,005,098, Cl. 260-308.00A.

Dornier System GmbH: *See—*
Hund, Roland, 4,004,759.

Dorofeev, Alexandr Grigorievich: *See—*
Gavrilov, Anatoly Nikolaevich; Godin, Eduard Moiseevich; Kebets, Leonid Nikolaevich; Beregovoi, Ivan Zakharovich; Matskevich, Vladimir Ivanovich; Korf, Yakov Osherovich; and Dorofeev, Alexandr Grigorievich, 4,004,420.

Dorsey, Geoffrey A., Jr., to Kaiser Aluminum & Chemical Corporation. Protective coating for aluminum products. 4,004,951, Cl. 148-6.270.

Dory, Jacques, to Realization Ultrasoniques. Ultrasonic examination. 4,005,258, Cl. 358-112.000.

Dost, Richard W.; Hudson, James L.; and Jordan, Larry L., to General Motors Corporation. Positive selective nickel alignment system. 4,004,955, Cl. 156-3.000.

Dow Chemical Company, The: *See—*
Bennett, Robert B., 4,004,394.

Dow Corning Limited: *See—*
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Griffiths, Brian John, 4,005,116.
Smith, Charles, 4,005,231.

Dowden, Dennis Albert; Shannon, Ian Robertson; and Spencer, Michael Staines, to Imperial Chemical Industries Limited. Treating hydrocarbons. 4,005,048, Cl. 252-432.000.

Drabek, Jozef: *See—*
Boger, Manfred; and Drabek, Jozef, 4,005,158.

Dransfield, Clifford D., to Atlantic Richfield Company. Means for flexibly guiding the travel of an upwardly propelled weight. 4,004,651, Cl. 181-117.000.

Dravo Corporation: *See—*
Briggs, Aubrey C., 4,004,696.

Dressen-Barnes Electronics Corporation: *See—*
Hinrichs, Karl, 4,005,317.

Dresser Industries, Inc.: *See—*
Purton, Robert Merrill; and Maddock, Robert Brent, 4,004,613.

Dreyer, William Emil. Cable lock for small appliances. 4,004,440, Cl. 70-15.000.

Dritt, William S.; Gerth, Howard L.; Knight, Charles E., Jr.; and Pardue, Robert M., to United States of America, Energy Research and Development Administration. Filament wound structure and method. 4,005,233, Cl. 428-35.000.

Du Pont of Canada Limited: *See—*
Beaton, Stephen Peter; and Harbourne, David Alan, 4,004,921.
Houston, Alvin John, 4,004,774.

Dubost, Gerard; and Havot, Henri Albert, to Etat Francais represente par le Delegue Ministeriel pour l'Armement. Thick folded dipole which is tuneable within a frequency band of two octaves. 4,005,430, Cl. 343-747.000.

Ducasse, Joseph Christophe Victor, to Unice Machine Company. Multistage continuous vacuum pan. 4,004,964, Cl. 159-17.00C.

Dula-Werke Dustmann & Co.: *See—*
Wesseler, Gerhard, 4,004,856.

Duncan, Damon H.; Herdman, Craig T.; and Littlejohn, Terrance V., to Sperry Rand Corporation. Magnetic disc memory. 4,005,490, Cl. 360-97.000.

Dunks, Clifford Matthew, to Materials and Methods Limited. Process for the manufacture of cast iron. 4,004,630, Cl. 164-57.000.

Dunlop Limited: *See—*
Kenney, Michael John, 4,004,467.

Dunning, Kenneth G.: *See—*
Smith, Carleton H.; and Dunning, Kenneth G., 4,004,945.

Dunwald, Willi; Lewalter, Jurgen; and Merten, Rudolf, to Bayer Aktiengesellschaft. Process for the preparation of polyhydantoins and polyparanic acids. 4,005,056, Cl. 260-77.5CH.

Du Pont de Nemours, E. I., and Company: *See—*
Faulhaber, Mark Edwin; and Smith, Edmund Haislett, Jr., 4,005,281.
Fuchs, Julius Jakob, 4,004,915.
Fukunaga, Tadamichi, 4,005,091.
Hawkins, William E., 4,004,738.
Krespan, Carl George, 4,005,104.
Singh, Gurdial; and von Rutte, Richard Edward, 4,005,057.

Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, to Smith Kline & French Laboratories Limited. Compositions and methods for inhibiting H_2histamine receptors. 4,005,205, Cl. 424-251.000.

Durham, Roger Owen. Two-position pedal for bicycles. 4,004,468, Cl. 74-594.400.

Dvorak, Alfred: *See—*
Kugler, Jindrich; Dvorak, Alfred; and Elliott, Charles John, 4,005,352.

Dwyer, James F. Device for imprinting indicia on a flexible article. 4,004,503, Cl. 101-9.000.

Dykes, Dewey B.; Powers, E. Michael; Foster, T. Kenneth; and Rogers, Robert E., to Jim Dandy Company, The. Multiple nozzle dispenser head. 4,005,226, Cl. 426-281.000.

Dzus Fastener Co., Inc.: *See—*
Schenk, Peter, 4,004,486.

E. R. Squibb & Sons, Inc.: *See—*
Miyadera, Tetsuo; Breuer, Hermann; and Treuner, Uwe D., 4,005,081.

Eason, Donald, to Lawrence Peska Associates, Inc., a part interest. Surface washing tool. 4,004,312, Cl. 15-29.000.

Eastman Kodak Company: *See—*
Orvis, Roy L., 4,004,929.
Reynolds, George A., 4,005,092.
Smola, Frank M.; and Breton, Henri E., 4,004,548.

Ebara Manufacturing Co., Ltd.: *See—*
Machi, Sueo; Kawamura, Keita; Aoki, Shingi; Kawakami, Waichiro; and Hashimoto, Shoji, 4,004,995.

Ebauches S.A.: *See—*
Schneiter, Ali, 4,004,411.

Economics Laboratory, Inc.: *See—*
Mizuno, William G.; and Henderson, Iris N., 4,004,685.

Edamatsu, Tetsuo: *See—*
Sogabe, Yoji; Edamatsu, Tetsuo; and Oka, Takashi, 4,004,828.

Eddlemon, Cecil A.; Harris, Robert J.; and Hanson, George E., to H. C. Price Co. Method and apparatus for preparing and packaging mastic coating material. 4,004,619, Cl. 141-11.000.

Edgar, William D.; Sustarsic, John D.; and Adamsky, Allan F., to Koppers Company, Inc. System for quenching hot coke. 4,004,985, Cl. 202-230.000.

Eds Inc.: *See—*
Sjogren, Christer A., 4,004,694.

Edwards, Bryant, to Illinois Tool Works Inc. Tapered plastic preform for telescopic application. 4,005,245, Cl. 428-542.000.

Edwards, John A.: *See—*
Beard, Colin C.; Edwards, John A.; and Fried, John H., 4,005,202.
Edwards, Thomas William: *See—*
Tshudy, Donald Richard; and Edwards, Thomas William, 4,004,954.
Eichenhofer, Kurt-Wilhelm; Schliebs, Reinhard; Brandl, Hermann; and Kohnen, Heinrich, to Bayer Aktiengesellschaft. Working up synthesis solutions obtained in production of hydrazine. 4,005,179, Cl. 423-407.000.
Eichhardt, Steven A.: *See—*
Lundquist, David E.; Hoffman, Paul R.; Su, Chauchang; Sung, Benjamin T.; and Eichhardt, Steven A., 4,005,435.
Eichweber, Kurt. Missile fire-control system and method. 4,004,487, Cl. 89-1.815.
Eide, Richard; and Golembeck, Gerald A., to United States Bedding Company, The. Compression tester. 4,004,457, Cl. 73-94.000.
Elco Corporation: *See—*
Sochor, Jerzy R., 4,004,845.
Electromechanics Research: *See—*
Fujita, Tadashi, 4,005,484.
Electroprint, Inc.: *See—*
Watanabe, Akinori; and Ando, Takao, 4,004,513.
Eli Lilly and Company: *See—*
Kukolja, Stjepan P.; and Lammert, Steven R., 4,005,074.
Elion, Gertrude B.: *See—*
Stickney, Dwight R.; Simmons, William S.; Nichol, Charles A.; Hitchings, George H.; and Elion, Gertrude B., 4,005,203.
Stickney, Dwight R.; Simmons, William S.; Nichol, Charles A.; Hitchings, George H.; and Elion, Gertrude B., 4,005,204.
Elk Manufacturing Company, Inc.: *See—*
Jones, Lloyd K.; and Yanov, David A., 4,004,775.
Elkem-Spigerverket: *See—*
Krogsrud, Harald, 4,005,252.
Ellin, Seymour, to Polaroid Corporation. Flash photographic system with camera inhibit feature. 4,005,449, Cl. 354-128.000.
Ellingson, Jerome B. Panels and the method of same for house construction. 4,004,387, Cl. 52-309.300.
Ellington, Thomas S., IV, to Western Electric Company, Inc. Bonding of leads. 4,004,726, Cl. 228-173.000.
Elliott, Charles John: *See—*
Kugler, Jindrich; Dvorak, Alfred; and Elliott, Charles John, 4,005,352.
Ellwood, Henry; and Rothwell, Maurice, to USM Corporation. Mixing and venting extruder. 4,004,787, Cl. 259-192.000.
Eltra Corporation: *See—*
Brayley, Elwin J.; Brownlee, Allen L.; and Garen, John C., 4,005,294.
Ely, Sherman S. Distal retraction clamp for rubber dam. 4,004,345, Cl. 32-36.000.
Emery, Alden H.; Lim, Henry C.; and Kolarik, Michael J., to Purdue Research Foundation. Enzyme entrappment with cellulose acetate formulations. 4,004,980, Cl. 195-68.000.
Emhart Industries, Inc.: *See—*
Rowe, George E., deceased, 4,004,906.
Emmett, John Colin: *See—*
Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,005,205.
Empey, Robert M., to Allis-Chalmers Corporation. Hopper gate for self-unloading ships. 4,004,700, Cl. 214-15.00D.
Emtrol Corporation: *See—*
Kalen, Bodo, 4,004,898.
Endo, Tomio: *See—*
Utsumi, Isamu; Endo, Tomio; Kamata, Tadaaki; and Ando, Masayasu, 4,005,200.
Engdahl, Jean, to Societe Suisse pour l'Industrie Horologere Management Services S.A. Data entry and decoding system for scripted data. 4,005,400, Cl. 340-365.00R.
Engeler, William E., to General Electric Company. Conductivity coupled split capacitor signal processing device and apparatus therefor. 4,005,377, Cl. 333-70.00T.
Engelhard Minerals & Chemicals Corporation: *See—*
Maxey, Van Q., 4,004,378.
Maxey, Van Q., 4,004,568.
Engelhardt, Roland: *See—*
Racine, Philippe; Higelin, Jean-Claude; Engelhardt, Roland; and Mindt, Wolfgang, 4,005,002.
English, Thomas Anthony. Femoral prosthesis. 4,004,300, Cl. 3-1.913.
Enthone, Incorporated: *See—*
Brindisi, Frank A., Jr., 4,004,956.
Environment/One Corporation: *See—*
Aker, Walter W.; and Naydan, Theodore T., 4,004,737.
Erdman, David M., to General Electric Company. Electronically commutated motor and method of making same. 4,005,347, Cl. 318-254.000.
Ernie Ball, Inc.: *See—*
Hiscott, Rolly R., 4,004,485.
Eschbach, Robert C.; and Colligan, John B., to Aztec Manufacturing Company. Extrusions for partitions, walls and enclosures. 4,004,373, Cl. 49-413.000.
Eschen, Robert M., Jr. Moveable barrier apparatus for roadway. 4,004,857, Cl. 404-6.000.
Escher Wyss G.m.b.H.: *See—*
Braun, Heinz; Dahl, Hans; Hefter, Jost; and Stotz, Wolf-Gunter, 4,004,968.
Esco Corporation: *See—*
Larson, Dean W., 4,004,445.
Estee Lauder, Inc.: *See—*
Gubernick, Joseph, 4,005,210.
Esterline Electronics Corporation: *See—*
Brown, Jack M., 4,005,298.
McDonald, Thomas Wayne, 4,005,420.
Esteve-Subirana, Antonio, to Laboratorios del Dr. Esteve, S.A. Hemostatic compositions comprising salts of substituted hydroquinone sulfonic acid. 4,005,220, Cl. 424-315.000.
Etablissements Rene Leduc & Fils: *See—*
Porel, Louis-Claude, 4,004,863.
Etat Francais: *See—*
Mechulam, Andre; Saintours-Payerne, Bruno M.; Gay-Chatain, Guillaume A.; and Montjallard, Paul R., 4,004,494.
Etat Francais represente par le Delegue Ministeriel pour l'Armement: *See—*
Dubost, Gerard; and Havot, Henri Albert, 4,005,430.
Eue, Ludwig: *See—*
Hack, Helmuth; Munz, Ferdinand; Eue, Ludwig; and Schafer, Werner, 4,004,913.
Eustace, Terence Leslie: *See—*
Millward, Thomas Hughes; Eustace, Terence Leslie; and Thompson, Barrie Arthur, 4,004,472.
Evans, Ralph K.; and Florian, Roy S., to Nickson Industries, Inc. Universal joint hanger for tailpipes and the like. 4,004,768, Cl. 248-59.000.
Evers, Robert C., to United States of America, Air Force. Fluorocarbon ether bis(o-aminophenol) compounds. 4,005,142, Cl. 260-571.000.
Expert Industrial Controls Limited: *See—*
Marsden, John Thomas, 4,004,343.
F. L. Smidth & Co.: *See—*
Sylvest, Karl Jens, 4,004,876.
F. L. Smithe Machine Company, Inc.: *See—*
Morgan, Gaylard M., 4,004,478.
Fabre, Alain: *See—*
Biola, Georges; Fabre, Alain; and Schneider, Gerard, 4,005,114.
Fabry, Gyorgy; Takacs, Istvan; and Kiszely, Gyorgy, to Richter Gedeon Vegyeszeti Gyar Rt. Material transmitting element for contacting streaming media of different phases or the same phase. 4,004,609, Cl. 137-512.150.
Facit Aktiebolag: *See—*
Amberntsson, Jan Roger; Andersson, Rober Ingemar; and Sultan, Stig Bertil, 4,005,440.
Faldi, Giovanni. Two stroke dredging plant. 4,004,357, Cl. 37-58.000.
Farmer, Ernest Leonard; and Findlay, Peter Michael, to Wildt Mellor Bromley Limited of Adelaide Works. Pattern mechanism. 4,004,439, Cl. 66-154.00A.
Farmila Farmaceutici Milano S.p.A.: *See—*
De Ruggieri, Pietro; and Sighinolfi, Orazio, 4,005,079.
Farrington, Gregory C.; and Roth, Walter L., to General Electric Company. Sealed lithium-chlorine cell. 4,004,946, Cl. 429-72.000.
Faulhaber, Mark Edwin; and Smith, Edmund Haislett, Jr., to Du Pont de Nemours, E. I., and Company. Defect identification with normalizing of gain function in optical-electrical inspection. 4,005,281, Cl. 235-151.300.
Faulkner, Hubert D., to Recognition Equipment Incorporated. Compact illumination system with light absorbing and reflecting walls. 4,005,286, Cl. 250-216.000.
Faulstich, Albert J.; Johnson, James B.; and Winkler, Gerhard B., to United States of America, Navy. Marker buoy recovery aid. 4,004,310, Cl. 9-9.000.
Fekl, Werner: *See—*
Mader, Helmut; Fekl, Werner; and Schultis, Klaus, 4,005,190.
Feldman, Alexandr Yakovlevich, deceased: *See—*
Andronov, Mikhail Alexandrovich; Bakun, Anatoly Nikolaevich; Mezhevich, Felix Evgenievich; Petrov, Mikhail Ivanovich; Belov, Jury Ivanovich; Feldman, Alexandr Yakovlevich, deceased; and Feldman, Raisa Alexandrovna, administratrix, 4,004,616.
Feldman, Raisa Alexandrovna, administratrix: *See—*
Andronov, Mikhail Alexandrovich; Bakun, Anatoly Nikolaevich; Mezhevich, Felix Evgenievich; Petrov, Mikhail Ivanovich; Belov, Jury Ivanovich; Feldman, Alexandr Yakovlevich, deceased; and Feldman, Raisa Alexandrovna, administratrix, 4,004,616.
Ferdelman, Donald Clarence: *See—*
Kong, Carlito Maristela; Wark, Emerson Lee; and Ferdelman, Donald Clarence, 4,004,432.
Fergusson, Robert Thomas, to Index, Incorporated. Electronic system for article identification. 4,004,904, Cl. 65-158.000.
Fernschild, Gunter; Rudolph, Werner; and Massonne, Joachim, to Kali-Chemie Aktiengesellschaft. Process for the recovery of antimony pentachloride from used catalyst solutions. 4,005,176, Cl. 423-87.000.
Ferro Manufacturing Corporation: *See—*
Pickles, Joseph, 4,004,772.
Fetter, Richard W., to United States of America, Navy. Simulator for doppler radar returns from precipitation. 4,005,424, Cl. 343-17.700.
Feuer, Mervyn L., to Robertshaw Controls Company. Multiple mode input analog controller having standby power supply and absence-of-input sensing. 4,005,409, Cl. 340-347.00C.
Ficalora, Peter J.; and Liu, Geoffrey Hao-Wen. Methods of increasing catalytic activity. 4,005,186, Cl. 423-659.000.
Fidi, Werner: *See—*
Gorike, Rudolf; Pless, Ernst; Fidi, Werner; and Fritz, Alexander, 4,005,267.

Fields, Ellis K., to Standard Oil Company (Indiana). Silver catalysts. 4,005,049, Cl. 252-467.000.

Fields, Ellis K.: *See—*
Cerefice, Steven A.; and Fields, Ellis K., 4,005,122.

Fijisawa, Seiji; Meki, Norio; and Irie, Hiroyuki, to Matsushita Electric Industrial Co., Ltd. Brightness and contrast control for television receiver. 4,005,262, Cl. 358-168.000.

Filipovich, Danny, to Bell & Howell Company. Dual beam rangefinder. 4,005,447, Cl. 354-166.000.

Findlay, Peter Michael: *See—*
Farmer, Ernest Leonard; and Findlay, Peter Michael, 4,004,439.

Findley, Gerald I., to International Business Machines Corporation. Merger and multiple translate tables in a buffered printer. 4,005,390, Cl. 340-172.500.

Firestone Tire & Rubber Company, The: *See—*
Lawson, David Francis; and Kang, Jung Wong, 4,005,248.

Firmenich & Cie: *See—*
Winter, Max; Gautschi, Fritz; Flament, Ivon; Stoll, Max; and Goldman, Irving M., 4,005,227.

Fischer, Earl Lee; and Gould, Jay W., III, to Minnesota Mining and Manufacturing Company. Clip for supplying implant projectiles. 4,004,565, Cl. 124-45.000.

Fischer, Earl Lee, to Minnesota Mining and Manufacturing Company. Clip and indexing mechanism for a gas-operated gun. 4,004,566, Cl. 124-59.000.

Fischer, Hans Peter: *See—*
Foery, Werner; and Fischer, Hans Peter, 4,004,908.
Foery, Werner; and Fischer, Hans Peter, 4,004,909.
Foery, Werner; and Fischer, Hans Peter, 4,004,910.

Fischer, Roman; Goetz, Norbert; and Mueller, Herbert, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Production of α,β-unsaturated ketones. 4,005,147, Cl. 260-593.00R.

Fisher Controls Company, Inc.: *See—*
Bachelder, Patrick Eugene; and Sumner, William David, 4,004,601.

Fisk, Harold E. Trailer hitch adapter. 4,004,822, Cl. 280-415.00A.

Flament, Ivon: *See—*
Winter, Max; Gautschi, Fritz; Flament, Ivon; Stoll, Max; and Goldman, Irving M., 4,005,227.

Fleck, Wolfgang: *See—*
Petersen, Rudolf Theodor; and Fleck, Wolfgang, 4,005,096.

Fleissner, Hans, to Vepa AG. Process for the treatment, particularly dyeing and printing of goods. 4,005,230, Cl. 427-354.000.

Flesburg, Edward E., to Caterpillar Tractor Co. Winch and fluid control system therefor. 4,004,779, Cl. 254-187.400.

Flibotte, George A.: *See—*
Hoffman, Louis S.; Patel, Navinchandra J.; and Flibotte, George A., 4,004,397.

Floral Innovations, Inc.: *See—*
O'Connell, Donald L., 4,004,367.

Florian, Roy S.: *See—*
Evans, Ralph K.; and Florian, Roy S., 4,004,768.

Fluid Kinetics, Inc.: *See—*
Puthoff, Carl Fredrick; and Gardner, James John, 4,004,463.

FMC Corporation: *See—*
Joseph, Craig L.; Caterina, Fred J.; and Cremer, Hans H., 4,004,648.

Focus/Board Inc.: *See—*
Kundert, Robert L., 4,004,799.

Foery, Werner; and Fischer, Hans Peter, to Ciba-Geigy Corporation. β-Halogenoethyl-silanes as stimulators for latex flow. 4,004,908, Cl. 71-79.000.

Foery, Werner; and Fischer, Hans Peter, to Ciba-Geigy Corporation. Beta-halogenoethyl-silanes as fruit abscission, ripening and thinning agents. 4,004,909, Cl. 71-79.000.

Foery, Werner; and Fischer, Hans Peter, to Ciba-Geigy Corporation. Beta-halogenoethyl-silanes as fruit ripening agents. 4,004,910, Cl. 71-79.000.

Folgero, Kare; and Norberg, Lars-Gunnar, to Allmanna Svenska Elektriska Aktiebolaget. Metallurgical furnace having fluid injection means for a melt in the furnace. 4,004,792, Cl. 266-218.000.

Foner, Simon. Magnetometer with out-of-phase correction. 4,005,358, Cl. 324-34.00R.

Foodways National, Inc.: *See—*
Borrello, Denis, 4,004,399.

Ford Motor Company: *See—*
Logothetis, Eleftherios M.; Laud, Kamlakar R.; and Park, Kwansuh, 4,004,452.
Rado, William G.; and Turner, Allen H., 4,004,562.

Formica Corporation: *See—*
Davis, Walter Thomas; and Kelly, Peter Bernard, 4,005,239.

Forst, Donald Laverne; and Schrengauer, Edwin Benedict, to Babcock & Wilcox Company, The. Load cell arrangement. 4,004,647, Cl. 177-128.000.

Fort, Pierre Henri Marie; and Pierrel, Michel, to Pont-A-Mousson S.A. Centrifugal casting machine casing and cooling apparatus. 4,004,632, Cl. 164-297.000.

Fortino, Samuel S. Electrical circuit continuity tester. 4,005,362, Cl. 324-51.000.

Foseco International Limited: *See—*
Ravault, Frank Ernest George, 4,004,933.

Fosler, Dick E., Jr.; and Krocheski, Thomas L., to Sperry Rand Corporation. Compatible standby power driver for a dynamic semiconductor. 4,005,395, Cl. 340-173.0DR.

Foster, Larry W., to Span-Deck, Inc. Apparatus for production of cast concrete members. 4,004,874, Cl. 425-438.000.

Foster, T. Kenneth: *See—*
Dykes, Dewey B.; Powers, E. Michael; Foster, T. Kenneth; and Rogers, Robert E., 4,005,226.

Fowler, John T.; and Key, William H., to Laitram Corporation, The. High pressure compass housing. 4,004,348, Cl. 33-364.000.

Fox, Homer M.: *See—*
Hill, George R.; and Fox, Homer M., 4,005,181.

Franch State, The: *See—*
Melchior, Jean; and Andre, Thierry, 4,004,414.

Franzer, Wolfgang; and Adamus, Hans. Flue gas collector for regeneratively-heated coke ovens. 4,004,986, Cl. 202-254.000.

Frechet, Daniel: *See—*
Gaignault, Jean-Cyr; Vacher, Jean; and Frechet, Daniel, 4,005,206.

Freck, David Vernon; and Hall, John Anthony, to Central Electricity Generating Board. Gas cooled nuclear reactors. 4,004,971, Cl. 176-37.000.

Fredericks, George: *See—*
List, Helmut; and Fredericks, George, 4,004,331.

Freed, Paul S., to Sinai Hospital of Detroit. Magnetically aligned releasable connector. 4,004,298, Cl. 3-1.000.

Freerksen, Enno, to Saarstickstoff-Fatol GmbH. Synergistic therapeutic composition for the treatment of mycobacterioses. 4,005,207, Cl. 424-263.000.

Freese, Lennart Werner. Conduit arrangement with protection against rupture and leakage. 4,004,607, Cl. 137-486.000.

Freimark, Max G. Birth control device. 4,004,591, Cl. 128-294.000.

Frey, Wolfgang: *See—*
Dickopp, Gerhard; Oertel, Lothar; and Frey, Wolfgang, 4,005,476.

Fried, John H.: *See—*
Beard, Colin C.; Edwards, John A.; and Fried, John H., 4,005,202.

Friedell, Morley V., to Martin Marietta Corporation. Swinging spherical gate valve and double seal quick disconnect coupling. 4,004,611, Cl. 137-614.000.

Friedman, Harvey S., to Polaroid Corporation. Photographic film processing apparatus. 4,005,446, Cl. 354-86.000.

Friedrichsfeld GmbH: *See—*
Heimke, Gunther; Griss, Peter; Von Andrian Werburg, Hanns; and Wachter, Paul, 4,004,581.

Frieling, Donald H.; Talbert, Sherwood G.; and Nathan, Richard A., to Battelle Development Corporation. Process and apparatus for solar energy collection and retrieval. 4,004,573, Cl. 126-271.000.

Fritz, Alexander: *See—*
Gorike, Rudolf; Pless, Ernst; Fidi, Werner; and Fritz, Alexander, 4,005,267.

Frohnwieser, Bernhard: *See—*
Heilmann, Wolfgang; Groetzner, Kurt; and Frohnwieser, Bernhard, 4,005,380.

Froloff, Helmut; and Tovar, Theodor, to Semikron Gesellschaft fur Gleichrichterbau und Elektronik m.b.H. Semiconductor device having a solderable contacting coating on its opposite surfaces. 4,005,454, Cl. 357-65.000.

Fruehan, Richard J., to United States Steel Corporation. Method of producing low nitrogen steel. 4,004,920, Cl. 75-60.000.

Fuchs, Julius Jakob, to Du Pont de Nemours, E. I., and Company. Herbicidal carbamates and thiolcarbamates. 4,004,915, Cl. 71-106.000.

Fuji Photo Film Co., Ltd.: *See—*
Yamamoto, Nobuo; Hori, Kiyotaka; Yoneyama, Masakazu; Nakayama, Yasuhiro; and Abe, Akira, 4,004,927.

Fuji Photo Optical Co., Ltd.: *See—*
Ando, Kunio, 4,005,445.
Mizukawa, Shigeo, 4,005,460.

Fujio, Masaaki. Capsule or seal carrying a certificate stamp or the like therein. 4,004,705, Cl. 215-246.000.

Fujita, Kinji, to Kabushiki Kaisha Suwa Seikosha. Digital display electronic timepiece. 4,004,407, Cl. 58-23.00R.

Fujita, Tadashi, to Electromechanics Research. Automatic stopper for multitrack recorder. 4,005,484, Cl. 360-74.000.

Fujiwara, Hideo; Ichinose, Yukio; Ichino, Kazuo; Orita, Isamu; Uesaka, Yasutaro; Itoh, Michiyasu; and Thuruoka, Hisashi, to Hitachi, Ltd. Digital displacement sensor with zigzag coils. 4,005,396, Cl. 340-196.000.

Fukasawa, Noburu: *See—*
Inoue, Naohiko; Yanagishima, Takayuki; Nakamura, Hiromichi; and Fukasawa, Noburu, 4,005,398.

Fukazawa, Nobuo: *See—*
Aya, Masahiro; Miyamoto, Masao; Fukazawa, Nobuo; and Yamagishi, Masaaki, 4,005,071.

Fukunaga, Tadamichi, to Du Pont de Nemours, E. I., and Company. Substituted trimethylene cyclopropanes, salts thereof, intermediates and methods of making the same. 4,005,091, Cl. 260-286.00R.

Fukuoka, Hiroshi; Kameyama, Teruhiko; Takahashi, Yuji; Nicho, Kenji; Misawa, Tatsuo; Inoue, Tsuneyuki; and Imai, Kimiaki, to Nissin Steel Co. Ltd.; and Japan Metals & Chemicals Co. Ltd. Method of treating waste produced during stainless steel making. 4,004,918, Cl. 75-11.000.

Fukuroi, Takeo; and Hayashi, Moriyoshi, to Yoshida Kogyo Kabushiki Kaisha. Slide fastener. 4,004,327, Cl. 24-205.13R.

Fukuzawa, Sogo: *See—*
Muro, Tomio; Chihara, Yasuaki; Fukuzawa, Sogo; Ogawa, Kiyoshi; and Nakanishi, Akira, 4,005,084.

Fulton Industries, Inc.: *See—*
Hockensmith, John L.; and Grove, John L., 4,004,695.

Furlenmeier, Andre; and Quitt, Peter, to Hoffmann-La Roche Inc. Water-soluble amoxicillin salts. 4,005,214, Cl. 424-271.000.

Furniss, Harry; and Grindrod, Jack, to Unit Wad Limited. Shot shell wadding. 4,004,522, Cl. 102-95.000.
Fusey, Pierre. Preparation of composition for converting hydrocarbons and fats into biodegradable aqueous emulsions. 4,005,043, Cl. 252-356.000.
Futatsugi, Setsuo: *See*—
Gerstine, Milton I.; Goldberg, Joshua I.; Futatsugi, Setsuo; Ueda, Kazuo; Seo, Ryozo; Iwasaki, Koji; and Uemura, Makoto, 4,004,756.
G. D. Searle & Co.: *See*—
Meyer, Rolf; Martin, Manuel I.; and Bolton, Ronald A., 4,004,883.
Oesterlin, Donald L.; and Obrycki, Raymond F., 4,005,292.
G.L.P. Company: *See*—
O'Donnell, John Francis, 4,004,545.
Gaehde, Joachim; Gesierich, Adolf; and Loeschcke, Ingrid, to Akademie der Wissenschaften der DDR. Metallized articles and method of producing the same. 4,005,238, Cl. 428-313.000.
Gahwiler, Hermann; and Schlaepfer, Hansjorg, to Contraves AG. Direct indicator device for determining the cardiac output flow rate according to the thermodilution method. 4,004,576, Cl. 128-2.05F.
Gaignault, Jean-Cyr; Vacher, Jean; and Frechet, Daniel, to Roussel-UCLAF. [9H]-Pyrido-[3,4-b]-indoles. 4,005,206, Cl. 424-263.000.
Gaind, Jagjit R.; and Nowaczyk, Philip J., to Zenith Radio Corporation. Protection circuit for battery powered electronic devices. 4,005,344, Cl. 317-31.000.
Gale, Preston Lee; and Roberts, James L., to Caterpillar Tractor Co. Powdered metal article having wear resistant surface. 4,004,889, Cl. 29-182.200.
Galgon Industries, Inc.: *See*—
Roderick, Zachary A., 4,004,669.
Gall, Martin, to Upjohn Company, The. 1-[(Dimethylamino)-methyl]-6-aryl-4H-imidazo[1,5-a][1,4]benzodiazepines. 4,005,099, Cl. 260-309.000.
Gallagher, John A.; and Broderick, Milan A., to Bell & Howell Company. Automatic focusing mechanism. 4,005,442, Cl. 354-25.000.
Gallagher, William: *See*—
Doman, Glidden S., 4,004,757.
Gallo, Charles F.; and Hammond, Thomas J., to Xerox Corporation. Efficient DC operated fluorescent lamps. 4,005,332, Cl. 315-112.000.
Ganellin, Charon Robin: *See*—
Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,005,205.
Ganter, Wolfgang; and Ginter, Albert, to Gebruder Junghans GmbH. Watch having a piezo electric buzzer mechanism. 4,004,409, Cl. 58-38.00R.
Gardell, Lars Johan; and Wilhelmsson, Bertil Lennart, to Saab-Scania Aktiebolag. Silencers. 4,004,650, Cl. 181-42.000.
Gardiner, Duncan, to Research Corporation. Curable compositions for bulking timber comprising (a) a modified polyol containing -0-3-alkyleneamido groups and (b) an amino resin precursor containing reactive N-hydroxymethyl groups. 4,005,039, Cl. 260-17.300.
Gardner-Denver Company: *See*—
Raby, Joseph M., 4,004,434.
Gardner, James John: *See*—
Puthoff, Carl Fredrick; and Gardner, James John, 4,004,463.
Garen, John C.: *See*—
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Gautschi, Fritz: *See*—
Winter, Max; Gautschi, Fritz; Flament, Ivon; Stoll, Max; and Goldman, Irving M., 4,005,227.
Gavinet, Jean; and Segurens, Louis, to Commissariat a l'Energie Atomique. Dynamic sealing device for high-temperature and high-pressure operation. 4,004,443, Cl. 72-253.00R.
Gavrilov, Anatoly Nikolaevich; Godin, Eduard Moiseevich; Kebets, Leonid Nikolaevich; Beregovoi, Ivan Zakharovich; Matskevich, Vladimir Ivanovich; Korf, Yakov Osherovich; and Dorofeev, Alexandr Grigorievich. Hydropneumatic pumping arrangement. 4,004,420, Cl. 60-464.000.
Gay-Chatain, Guillaume A.: *See*—
Mechulam, Andre; Saintours-Payerne, Bruno M.; Gay-Chatain, Guillaume A.; and Montjallard, Paul R., 4,004,494.
Geaney, Sheila A., to Allerald Company, Inc. Facially-worn breathing filter. 4,004,584, Cl. 128-140.00N.
Gebelin, Bernard, to Societe Franco-Americaine de Constructions Atomiques-Framatome. Device for positioning a member on a tubular plate. 4,004,698, Cl. 214-1.0BB.
Gebr. Hofmann KG Maschinenfabrik: *See*—
Himmler, Gunther, 4,004,464.
Gebruder Junghans GmbH: *See*—
Ganter, Wolfgang; and Ginter, Albert, 4,004,409.
Gee, Ted F., to General Motors Corporation. Turbine blade with configured stalk. 4,004,860, Cl. 416-2.000.
Geimuplast Peter Mundt KG: *See*—
Urban, Otfried, 4,004,340.
Gelfand, Samuel, to Hooker Chemicals & Plastics Corporation. Polyhalocyclopentenyl phenyl compounds. 4,005,153, Cl. 260-650.00R.
Gendrich, Ronald Lee; Rippel, Riemond Henry; and Seely, John Hunter, to Abbott Laboratories. [Des-gly]^{10}-GnRH nonapeptide anide analogs in position 6 having ovulation-inducing activity. 4,005,063, Cl. 260-112.5LH.
General Atomic Company: *See*—
Bokros, Jack C., 4,005,163.
General Electric Company: *See*—
Brown, Edgar D., Jr.; and Traver, Frank J., 4,005,023.
Cook, Newell C.; and Davis, Gary C., 4,005,102.
Dada, Abdul Gaffar, 4,005,042.
Dix, Joseph; Campbell, Norman; and Tonseth, Ivar Scott, Jr., 4,004,490.
Engeler, William E., 4,005,377.
Erdman, David M., 4,005,347.
Farrington, Gregory C.; and Roth, Walter L., 4,004,946.
Glascock, Homer H., Jr.; and Anderson, John M., 4,005,330.
Joynson, Reuben E.; Mundy, Joseph L.; and Banerji, Ranan, 4,005,385.
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Raleigh, William J., 4,005,044.
Smith, William E., 4,005,112.
Smith, William E., 4,005,113.
Stoner, Jesse A., 4,004,725.
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Hall, Godfrey Stephen; and Leworthy, John Harwood, 4,004,674.
General Motors Corporation: *See*—
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Dost, Richard W.; Hudson, James L.; and Jordan, Larry L., 4,004,955.
Gee, Ted F., 4,004,860.
Jacoby, Gerald B.; and Mathues, Thomas P., 4,004,423.
Kong, Carlito Maristela; Wark, Emerson Lee; and Ferdelman, Donald Clarence, 4,004,432.
Nagy, Louis L., 4,005,425.
Podolan, Edward G.; and Surhigh, Lawrence A., 4,004,371.
Scheibe, Elias W., 4,004,558.
Snyder, George E., 4,004,707.
Subhedar, Jayant W., 4,004,826.
Wanke, William L., 4,004,717.
General Signal Corporation: *See*—
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General Tire & Rubber Company, The: *See*—
Jones, Billy Joe; Linnstaedter, Donald James; and Monajjem, Freydoun, 4,004,958.
George, Loyd William, to Boeing Company, The. Ultrasonic water jet. 4,004,736, Cl. 239-102.000.
Georgeau, Phillip Carl; and Winebrenner, Lester I., to Champion International Corporation. Resilient organic microspheres in mastic adhesives, sealants, caulks, coating compounds and related products, and methods of manufacture. 4,005,033, Cl. 260-2.50B.
Georgetown University: *See*—
Ledley, Robert S., 4,005,311.
Gerber, Arthur H.: *See*—
Reynard, Kennard A.; and Gerber, Arthur H., 4,005,171.
Gerber, Jon A. Spiral manipulative game. 4,004,808, Cl. 273-108.000.
Gerber, Melvin N.; Cannon, Robert T.; and Penn, Mitchell E., to United States of America, Army. Pyrotechnic munition and process. 4,004,517, Cl. 102-65.000.
Gerber Products Company: *See*—
Ryan, James; and Vandenberg, Robert W., 4,004,728.
Gerstine, Milton I.; Goldberg, Joshua I.; Futatsugi, Setsuo; Ueda, Kazuo; Seo, Ryozo; Iwasaki, Koji; and Uemura, Makoto, to Boeing Company, The. Automatic flight control means for rotary wing aircraft. 4,004,756, Cl. 244-17.130.
Gerth, Howard L.: *See*—
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Gertsch AG: *See*—
Svoboda, Josef, 4,004,824.
Gesierich, Adolf: *See*—
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Getchell, F. Grant. Drapery holder. 4,004,319, Cl. 16-93.00D.
Gewerkschaft Eisenhutte Westfalia: *See*—
Plevak, Lubomir; and Holken, Norbert, 4,004,771.
Gholson, William T. Game apparatus. 4,004,804, Cl. 273-5.00R.
Giacovas, Alfred. Air filter construction. 4,004,899, Cl. 55-499.000.
Giarritta, Ninfa R., to Lawrence Peska Associates, Inc. Coupon holder. 4,004,690, Cl. 206-425.000.
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Gillette Company, The: *See*—
Hyland, Francis B., 4,004,596.
Gilmore-Tatge Manufacturing Co., Inc.: *See*—
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Pickering, John Flory, 4,004,425.
GKN Transmissions Limited: *See*—
Millward, Thomas Hughes; Eustace, Terence Leslie; and Thompson, Barrie Arthur, 4,004,472.

Glascock, Homer H., Jr.; and Anderson, John M., to General Electric Company. Electrodeless fluorescent lamp. 4,005,330, Cl. 315-57.000.

Glasell, Don Leon. Article carrier. 4,004,689, Cl. 206-387.000.

Glinsmann, Gilbert R.: *See*—
Needham, Riley B.; Glinsmann, Gilbert R.; and Wier, Donald R., 4,004,637.

Godin, Eduard Moiseevich: *See*—
Gavrilov, Anatoly Nikolaevich; Godin, Eduard Moiseevich; Kebets, Leonid Nikolaevich; Beregovoi, Ivan Zakharovich; Matskevich, Vladimir Ivanovich; Korf, Yakov Osherovich; and Dorofeev, Alexandr Grigorievich, 4,004,420.

Goel, Narendra S.: *See*—
Meltzer, David W.; and Goel, Narendra S., 4,005,438.

Goetz, Norbert: *See*—
Fischer, Roman; Goetz, Norbert; and Mueller, Herbert, 4,005,147.

Goffinet, Bernard, to Roussel-UCLAF. Resolution of dl-allethrolone. 4,005,146, Cl. 260-586.00R.

Goggins, William B., Jr., to United States of America, Air Force. Method for providing means to eliminate ambiguous polarization effects on phase and amplitude of radar backscatter due to unknown target aspect angle. 4,005,414, Cl. 343-5.0SA.

Gold, Gary K.; and Hart, Alan H. Dental device. 4,004,344, Cl. 32-27.000.

Gold, Louis. Coal reactor. 4,004,895, Cl. 48-101.000.

Goldberg, Joshua I.: *See*—
Gerstine, Milton I.; Goldberg, Joshua I.; Futatsugi, Setsuo; Ueda, Kazuo; Seo, Ryozo; Iwasaki, Koji; and Uemura, Makoto, 4,004,756.

Goldman, Irving M.: *See*—
Winter, Max; Gautschi, Fritz; Flament, Ivon; Stoll, Max; and Goldman, Irving M., 4,005,227.

Golembeck, Gerald A.: *See*—
Eide, Richard; and Golembeck, Gerald A., 4,004,457.

Golias, Tipton L.; and Butts, Gene A., to Helena Laboratories Corporation. Method and apparatus for graphic densitometer display. 4,005,434, Cl. 346-1.000.

Gomlyakov, Valery Ilich: *See*—
Strelchenko, Vladimir Sergeevich; and Gomlyakov, Valery Ilich, 4,004,442.

Gongwer, Calvin A., to Bendix Corporation, The. Hydrodynamic stabilizing device. 4,004,308, Cl. 9-8.00R.

Gongwer, Calvin A., to Bendix Corporation, The. Hydrodynamic stabilizing device. 4,004,309, Cl. 9-8.00R.

Goodnight, Hershel E.: *See*—
Zink, John Smith; and Goodnight, Hershel E., 4,004,875.

Goodrich, David G.; and John, Ludwig, to Kaiser Aluminum & Chemical Corporation. Electromagnetic casting apparatus. 4,004,631, Cl. 164-250.000.

Goodyear Tire & Rubber Company, The: *See*—
Sandstrom, Paul H.; and Lal, Joginder, 4,004,627.

Gordon Johnson Company: *See*—
Scheier, Donald J.; and Haynes, Homer A., 4,004,320.

Gordon, Stuart: *See*—
Clifford, David Victor; Bell, Stephen William; Gordon, Stuart; and Jones, Philip Graham, 4,004,523.

Gorey, Edward F.; and Schwuttke, Guenter H., to International Business Machines Corporation. Impact sound stressing for semiconductors. 4,004,449, Cl. 73-12.000.

Gorham International Inc.: *See*—
Ravich, Leonard E., 4,004,711.

Gorike, Rudolf; Pless, Ernst; Fidi, Werner; and Fritz, Alexander, to AKG Akustische u. Kino-Gerate Gesellschaft m.b.H. Arrangement for converting oscillations in headphones. 4,005,267, Cl. 179-1.00J.

Gorike, Rudolf, to AKG Akustische u. Kino-Gerate Gesellschaft m.b.H. Headphone. 4,005,278, Cl. 179-181.00R.

Gorwara, Ashok K., to Stanford Research Institute. Cooperative signal processing beacon transponder. 4,005,418, Cl. 343-6.80R.

Gotchel, Joel Peter; Norton, Henry James; Spengos, Aris Constantine; and Vaalburg, Lawrence, to Scott Paper Company. Method of forming a nonwoven fibrous web. 4,004,323, Cl. 19-156.300.

Gottschalk, Peter; Schoellig, Alfred; and Riedel, Guenther, to BASF Aktiengesellschaft. Isotridecylammonium salts of chromium or cobalt 1:2 complex azo dyes. 4,005,066, Cl. 260-145.00A.

Gouin, William M.: *See*—
Harris, James M.; and Gouin, William M., 4,005,472.

Gould, Jay W., III: *See*—
Fischer, Earl Lee; and Gould, Jay W., III, 4,004,565.

Grachev, Viktor Pavlovich: *See*—
Chumakov, Mikhail Petrovich; Prokhorova, Inna Alexandrovna; Grachev, Viktor Pavlovich; Petukhova, Valentina Vasilievna; Svezhinina, Julia Anatolievna; Mironova, Ljubov Leonidovna; Ralf, Ninel Mikhailovna; Popova, Valentina Dmitrievna; Mustafina, Aida Nurislamovna; and Chernyshev, Vladimir Ivanovich, 4,004,974.

Graebe, Robert H. Expandable multicelled cushioning structure. 4,005,236, Cl. 428-72.000.

Graf, Felix; and Wirz, Armin, to Rieter Machine Works, Ltd. Inductively heated drawroll. 4,005,302, Cl. 219-10.610.

Graham, Clifford Arthur Andrew; and Linehan, Kevin Lawrence, to ICI Australia Limited. Composition in substantially rigid block form for controlling or preventing bloat in animals. 4,005,192, Cl. 424-157.000.

Graham, Curtis Michael, to Ashland Oil, Inc. Pressure sensitive adhesive compositions. 4,005,247, Cl. 526-15.000.

Graham, Jerry P., to Sound Technology, Inc. Secure remote control communication systems. 4,005,428, Cl. 343-228.000.

Graham Magnetics Incorporated: *See*—
Deffeyes, Robert J.; and Tyler, Wesley R., 4,004,917.

Graphic Sciences, Inc.: *See*—
Krallinger, Robert E.; Ignatjev, Vladimir; Rand, Ralph K.; and Costello, Matthew Joseph, 4,005,257.

Gray, Ronald D., to Leotromelt Corporation. Dual holding furnace. 4,004,793, Cl. 266-236.000.

Grechinsky, Dmitry Alexeevich: *See*—
Yakshin, Alexandr Sergeevich; Novikov, Oleg Nikolaevich; Grechinsky, Dmitry Alexeevich; Klochko, Viktor Alexandrovich; and Rygalin, Viktor Georgievich, 4,004,450.

Green, Alice, to Raymond Lee Organization, Inc., The, a part interest. Shopping cart. 4,004,825, Cl. 280-654.000.

Green, Harold A.; Merianos, John J.; and Petrocci, Alfonso N., to Millmaster Onyx Corporation. Microbiocidal polymeric quaternary ammonium compounds. 4,005,193, Cl. 424-168.000.

Green, William J., to Watters, James P. Studded sole and heel plates for shoes. 4,004,356, Cl. 36-134.000.

Greenberger, Joseph Irwin, to Wean United, Inc. Combination strip contacting device for use in a rolling mill. 4,004,459, Cl. 73-144.000.

Greenhalgh, Geoffrey Harvey; Wedlake, Roger John; and DeJager, Pieter Willem Gideon, to De Beers Industrial Diamond Division Limited. Method for producing synthetic diamonds. 4,005,180, Cl. 423-446.000.

Greenley, Henry R. Method of making a structural member. 4,004,334, Cl. 29-155.00R.

Greiner, Richard William, to Hercules Incorporated. Low molecular weight copolymers. 4,005,250, Cl. 526-204.000.

Griffith, Paul Arthur: *See*—
Byrne, James Donald; and Griffith, Paul Arthur, 4,004,882.

Griffiths, Brian John, to Dow Corning Limited. Organosilicon compounds. 4,005,116, Cl. 260-448.20N.

Griffiths, Brian John: *See*—
Chandra, Grish; and Griffiths, Brian John, 4,005,046.

Grimes Manufacturing Company: *See*—
Rabe, Blaine R., 4,005,337.

Grimova, Jaroslava: *See*—
Semonsky, Miroslav; Cerny, Antonin; Nemecek, Oldrich; Rezabek, Karel; Seda, Miroslav; Trcka, Vaclav; and Grimova, Jaroslava, 4,005,090.

Grindrod, Jack: *See*—
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Griss, Peter: *See*—
Heimke, Gunther; Griss, Peter; Von Andrian Werburg, Hanns; and Wachter, Paul, 4,004,581.

Groenendaal, Willem; Taubert, Friedrich C.; Naber, Jaap E.; and Bekker, Gijsbertus A., to Shell Oil Company. Removal of sulfur oxides and particulate matter from waste gas streams. 4,004,885, Cl. 23-260.000.

Groetzner, Kurt: *See*—
Heilmann, Wolfgang; Groetzner, Kurt; and Frohnwieser, Bernhard, 4,005,380.

Grosvenor, Derek; and Nicholson, John Robert Frederick, to Tioxide Group Limited. Glazing compositions for ceramic articles. 4,004,935, Cl. 106-48.000.

Grotnes, Eugene R., to Atlanta Grotnes Machine Company. Can head seaming method and apparatus. 4,004,529, Cl. 113-58.000.

Grove, John L.: *See*—
Hockensmith, John L.; and Grove, John L., 4,004,695.

Grumman Aerospace Corporation: *See*—
Leszak, Edward H., 4,004,441.

Gruppo Lepetit S.p.A.: *See*—
Cricchio, Renato; and Lancini, Giancarlo, 4,005,076.
Pifferi, Giorgio, 4,005,082.

Grushko, July Sergeevich: *See*—
Alexandrov, Anatoly Julianovich; Grushko, July Sergeevich; Makarov, Evgeny Fredovich; Mishin, Konstantin Yakovlevich; and Baltrunas, Daljus Antanas Jono, 4,004,970.

GTE Sylvania Incorporated: *See*—
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Casella, Daniel C., 4,005,336.
Coppock, Richard A., 4,005,275.
Lin, Ching San; and Smith, James Thomas, 4,004,891.

Gubbels, Jan M. H.; and Houbiers, Johannes P. M., to Andeno B.V. Process for the chemical separation of racemic modifications of α-aminocarboxylic acid derivatives, and cinchonidine salt intermediates. 4,005,088, Cl. 260-284.000.

Gubernick, Joseph, to Estee Lauder, Inc. Protein containing emollient composition for a skin moisturizer. 4,005,210, Cl. 424-359.000.

Gudgel, Willard Leon: *See*—
Agnew, Mark Charles; Best, James Jacob; and Gudgel, Willard Leon, 4,004,795.

Guerrero, Lois L. Taco holding tray. 4,004,501, Cl. 99-426.000.

Guha, Dwipendra Nath, to Avnet, Inc. Programmer for record player. 4,004,816, Cl. 274-10.00R.

Guhl, Richard E.; and Oswald, Charles W., to Caterpillar Tractor Co. Transmission and parking brake control system. 4,004,665, Cl. 192-4.00A.

Guldenfels, Willi; and Carlstrom, Borge Ingmar, to Basler Stuckfarberei AG. Cylindrical receptacle of fiber-reinforced plastic and method of manufacturing a receptacle. 4,004,706, Cl. 220-3.000.

Gulf Research & Development Company: *See*—
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Gustavsson, Rune: *See*—
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Guthrie, Robert William; and Kierstead, Richard Wightman, to Hoff-

mann-La Roche Inc. Hydroxycitric acid derivatives. 4,005,086, Cl. 260-247.20A.
Gutner, Kenneth H. Bed canopy frame. 4,004,306, Cl. 5-362.000.
Guttinger, Manfred; and Schermutzki, Konrad, to Sandco Ltd. Dual-belt cooling system. 4,004,870, Cl. 425-224.000.
H. C. Price Co.: *See*—
Eddlemon, Cecil A.; Harris, Robert J.; and Hanson, George E., 4,004,619.
Haas, Werner E. L.; Adams, James E., Jr.; and Richter, Bela, to Xerox Corporation. Liquid crystalline composition having mixed cholesteric-nematic properties. 4,005,032, Cl. 252-299.000.
Habdas, Edward P., to Universal Oil Products Company. Automotive oil cooler. 4,004,634, Cl. 165-155.000.
Habgood, Gordon Alfred: *See*—
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Hack, Helmuth; Munz, Ferdinand; Eue, Ludwig; and Schafer, Werner, to Bayer Aktiengesellschaft. Selective herbicidal compositions. 4,004,913, Cl. 71-90.000.
Hadtke, Frederick B., to Airwick Industries, Inc. Dispenser for air treating material. 4,004,734, Cl. 239-58.000.
Haese, Egon; and Moll, Hans, to Dr. C. Otto & Comp. G.m.b.H. Apparatus for continuously withdrawing solids which form a sediment in a liquid. 4,005,016, Cl. 210-268.000.
Haese, Egon, to Dr. C. Otto & Comp. G.m.b.H. Method for carrying out endothermic chemical reactions with the use of nuclear reactor cooling gases. 4,005,045, Cl. 252-373.000.
Hailey, William H.: *See*—
Berger, Robert L.; Hailey, William H.; Mallick, George, Jr.; Mannbeck, Donald H.; and Weight, Wilber J., 4,005,365.
Halkey-Roberts Corporation: *See*—
Mackal, Glenn H.; Lardner, George E.; and Maz, Joseph, 4,004,614.
Hall, Godfrey Stephen; and Leworthy, John Harwood, to General Electric Company Limited, The. Printing devices. 4,004,674, Cl. 197-1.00R.
Hall, John Anthony: *See*—
Freck, David Vernon; and Hall, John Anthony, 4,004,971.
Hallock, Robert L. Fastener for attachment to metallic structures. 4,004,483, Cl. 85-10.00E.
Hamilton, Douglas D., to Logging Development Corporation. Harvester processor assembly. 4,004,622, Cl. 144-3.00D.
Hammann, Ingeborg: *See*—
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Hammarstrom, Anders B., to Telefonaktiebolaget L M Ericsson. Slot antenna with waveguide coupling. 4,005,431, Cl. 343-771.000.
Hammond, Keith C. Self-masking X-ray viewing apparatus. 4,004,360, Cl. 40-106.100.
Hammond, Thomas J.: *See*—
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Hamy, Norbert, to Trebron Holdings Limited. Elevator structure supporting apparatus. 4,004,654, Cl. 187-16.000.
Hanakata, Takayoshi: *See*—
Hirano, Reiji; Hanakata, Takayoshi; and Ito, Matsutoshi, 4,004,672.
Hanner, Richard E. Long jump marking board. 4,004,800, Cl. 272-101.000.
Hanson, Alden W. Snow making method. 4,004,732, Cl. 239-2.00S.
Hanson, George E.: *See*—
Eddlemon, Cecil A.; Harris, Robert J.; and Hanson, George E., 4,004,619.
Hanson, Harry T.: *See*—
Chenevey, Edward C.; and Hanson, Harry T., 4,005,058.
Happer, William; and Tang, Henry Y. S. Method and apparatus for stimulating narrow line resonance conditions. 4,005,355, Cl. 324-.50F.
Harbourne, David Alan: *See*—
Beaton, Stephen Peter; and Harbourne, David Alan, 4,004,921.
Hardouin, Michel Jean Charles: *See*—
Tilly, Guy; Hardouin, Michel Jean Charles; and Lautrou, Jean, 4,005,188.
Hardt, Dietrich: *See*—
Mietzsch, Fritz; Hardt, Dietrich; Serini, Volker; Bartl, Herbert; and Vernaleken, Hugo, 4,005,037.
Hardy, Claude. Mold gate apparatus. 4,004,871, Cl. 425-243.000.
Hardy, Peter D., to Metal Box Limited. Conveyor systems. 4,004,678, Cl. 198-460.000.
Harland, Philip W., to Ametek, Inc. Illuminated indicator gauge. 4,004,546, Cl. 116-129.00L.
Harrington, Joseph Kenneth: *See*—
Moore, George G. I.; and Harrington, Joseph Kenneth, 4,005,141.
Harrington & Richardson, Inc.: *See*—
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Harrington, Timothy M., to MDH Industries, Inc. Digital circuit for measuring relative frequency in separate pulse trains. 4,005,364, Cl. 324-79.00D.
Harris, Howard R., to Cabot Corporation. Preparation of pelletized carbon blacks. 4,005,170, Cl. 264-117.000.
Harris, James M.; and Gouin, William M., to National Semiconductor Corporation. Method for gold plating of metallic layers on semiconductive devices. 4,005,472, Cl. 357-71.000.
Harris, Robert J.: *See*—
Eddlemon, Cecil A.; Harris, Robert J.; and Hanson, George E., 4,004,619.
Harrison, George H. Crab meat expressing machine and method. 4,004,321, Cl. 17-48.000.
Hart, Alan H.: *See*—
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Hartel, Hagen, to Kind, Dieter. Apparatus for the current limiting interruption of currents at high voltages. 4,005,340, Cl. 317-11.00A.
Hartman, William L., to Procter & Gamble Company, The. Scouring compositions. 4,005,027, Cl. 252-95.000.
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Hawkes, Charles Vivian, to Research Association for the Paper and Board Printing and Packaging Industries, The. Method for producing bookcovers. 4,005,165, Cl. 264-135.000.
Hawkins, William E., to Du Pont de Nemours, E. I., and Company. Method of and apparatus for shredding a web of plastic film. 4,004,738, Cl. 241-29.000.
Hayashi, Moriyoshi: *See*—
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Heaney, James J., to Anthony's Manufacturing Company, Inc. Insulated door mounting frame structure. 4,004,370, Cl. 49-70.000.
Heath, James C.; Werner, Raymond E.; Delaney, John W.; and Crounse, Nathan N., to Sterling Drug Inc. Detergent compositions containing novel crystalline forms of optical brighteners. 4,005,026, Cl. 252-89.00B.
Heckert, David C.; and Watt, David M., Jr., to Procter & Gamble Company, The. Organosilane-containing detergent composition. 4,005,028, Cl. 252-99.000.
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Heier, Robert J.; and Pettibone, Wayne E., to Owens-Illinois, Inc. Line combining apparatus. 4,004,677, Cl. 198-452.000.
Heilmann, Wolfgang; Groetzner, Kurt; and Frohnwieser, Bernhard, to Robert Bosch G.m.b.H. Clip-on inductive pulse pick-up. 4,005,380, Cl. 336-84.000.
Heimke, Gunther; Griss, Peter; Von Andrian Werburg, Hanns; and Wachter, Paul, to Friedrichsfeld GmbH. Tool for forming a bed in a hip bone to receive an artificial acetabulum. 4,004,581, Cl. 128-92.00E.
Heinemann, Otto; Schmits, Heinz-Herbert; and Baldus, Heinz Dieter, to Polysius AG. Roller crushing mill. 4,004,740, Cl. 241-52.000.
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Helding, Norman A., to Sun Chemical Corporation. Rotatable ultraviolet lamp reflector and heat sink. 4,005,135, Cl. 250-527.000.
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Henderson, Iris N.: *See*—
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Henderson, Michael L. Apparatus and method for automatically propelling game balls for practice. 4,004,567, Cl. 124-61.000.

Hendrickson, Vergil P., to Caterpillar Tractor Co. Motor grader drawbar assembly with safety clutch mechanism. 4,004,641, Cl. 172-781.000.
Henig, Seymour: *See—*
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Henrie, Darwin E. Game apparatus. 4,004,810, Cl. 273-134.0GM.
Henry, Woodrow, II. Equine training aid balancer. 4,004,403, Cl. 54-71.000.
Hensel, Roy E., to American Hoechst Corporation. Method of using a test film to measure developer activity. 4,004,923, Cl. 96-27.00R.
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Herring, William M.; and Walling, Dennis B., to Standard Oil Company. Computer control system. 4,005,387, Cl. 340-172.500.
Hess, Charles W., to Speco, Inc. Rotary meat grinder with bone-collecting facilities. 4,004,742, Cl. 241-82.500.
Hesse, Sarah; and Shapiro, Justin J. Graphics instrument. 4,004,347, Cl. 33-120.000.
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Higgins, Francis J.; McGraw, Charles T.; and Sanderson, Edward L., to United States of America, Navy. Galvanic detector for detecting the cutting of a command wire. 4,004,540, Cl. 114-244.000.
Hilaire, Fernand, to Captocap Limited. Tamper-proof closure with safety means. 4,004,704, Cl. 215-220.000.
Hildreth, Thomas L., to Johnson Corporation, The. Control for cooling unit. 4,004,431, Cl. 62-228.000.
Hill, Billy R., to Cerco Tires Inc. Battery powered fluid transfer apparatus. 4,004,862, Cl. 417-234.000.
Hill, George R.; and Fox, Homer M., to Phillips Petroleum Company. Method to make carbon black utilizing polymers. 4,005,181, Cl. 423-449.000.
Hill, John; and Turczanki, Henry, to Comtelco (U.K.) Limited. Apparatus for reed switch manufacture. 4,004,337, Cl. 29-756.000.
Hill, John C.: *See—*
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Hill, Michael; Intrater, Josef; and Yasar, Tugrul, to Semimetals, Inc. Semiconductor assembly, method of manufacturing same, and bonding agent therefor. 4,005,457, Cl. 357-72.000.
Hille, Earl A.: *See—*
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Himmler, Gunther, to Gebr. Hofmann KG Maschinenfabrik. Method and transducer and apparatus for selectively measuring oscillation components from an oscillation spectrum. 4,004,464, Cl. 73-462.000.
Hinojosa, Carlos R., to Besenbruch-Hofmann, Inc. Reversible socket wrench. 4,004,666, Cl. 192-44.000.
Hinrichs, Karl, to Dressen-Barnes Electronics Corporation. Switching circuitry. 4,005,317, Cl. 307-253.000.
Hinton, Melvin F., to Reed Irrigation Systems. Differential controller valve and sequencer. 4,005,013, Cl. 210-106.000.
Hirano, Reiji; Hanakata, Takayoshi; and Ito, Matsutoshi, to Canon Kabushiki Kaisha. Printing control device. 4,004,672, Cl. 197-1.00R.
Hiscott, Rolly R., to Ernie Ball, Inc. Mechanism for adjusting tension of an elongated filament. 4,004,485, Cl. 84-207.000.
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Hjortzberg, Bernhard A., to BASF Aktiengesellschaft. Method and apparatus for synchronizing record and playback of video signals. 4,005,473, Cl. 358-4.000.
Ho, Pang-Ting; and Rosen, Arye, to RCA Corporation. Frequency tunable microwave apparatus having a variable impedance hybrid idler circuit. 4,005,372, Cl. 330-34.000.
Hockensmith, John L.; and Grove, John L., to Fulton Industries, Inc. Channel and plate telescopic crane boom. 4,004,695, Cl. 212-144.000.
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Ishikawa, Katsuji: *See—*
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Ishikawa, Masakazu; Ota, Takaaki; Ishigami, Noriakira; and Kozakai, Asao, to Toyota Jidosha Kogyo Kabushiki Kaisha. Electrical switch for a braking fluid pressure fault alarm device. 4,005,401, Cl. 340-52.00C.
Ishizaka, Otaharu. Method for hydrogen generation. 4,005,185, Cl. 423-648.000.

Ito, Matsutoshi: *See*—
Hirano, Reiji; Hanakata, Takayoshi; and Ito, Matsutoshi, 4,004,672.

Ito, Yoshio; Kitajima, Tadayuki; and Touyama, Yoshikuni, to Canon Kabushiki Kaisha. Dry developing mechanism. 4,004,714, Cl. 222-41.000.

Ito, Yoshio; and Mashiko, Toshio, to Kao Soap Co., Ltd.; and Nippon Peroxide Co., Ltd. Stable sodium sulfate-hydrogen peroxide-sodium chloride adduct and process for preparing same. 4,005,182, Cl. 423-467.000.

Itoh, Michiyasu: *See*—
Fujiwara, Hideo; Ichinose, Yukio; Ichino, Kazuo; Orita, Isamu; Uesaka, Yasutaro; Itoh, Michiyasu; and Thuruoka, Hisashi, 4,005,396.

Itoh, Tomo, to Hitachi, Ltd. Alarm device for use in exhaust gas recirculating system. 4,004,559, Cl. 123-119.00A.

ITT Industries, Inc.: *See*—
Burgdorf, Jochen, 4,004,839.

Iwasaki, Koji: *See*—
Gerstine, Milton I.; Goldberg, Joshua I.; Futatsugi, Setsuo; Ueda, Kazuo; Seo, Ryozo; Iwasaki, Koji; and Uemura, Makoto, 4,004,756.

Iwata, Hiroshi; and Ishikawa, Katsuji, to West Electric Company, Ltd. Programmed shutter. 4,005,448, Cl. 354-30.000.

J. Bobst & Fils S.A.: *See*—
Roch, Roger, 4,004,510.

J. I. Case Company: *See*—
Beck, Michael J., 4,004,499.

J.I.P. Industries, Inc.: *See*—
Jeppsen, Harvey I., 4,004,782.

J. M. Huber Corporation: *See*—
Oder, Robin R., 4,005,008.

J. P. Stevens & Co., Inc.: *See*—
Spence, Junior C.; Rorrer, Robert J.; and Holt, James L., 4,004,617.

J. Pfrimmer & Co.: *See*—
Mader, Helmut; Fekl, Werner; and Schultis, Klaus, 4,005,190.

Jackson, Leigh F.: *See*—
Kraft, Joseph K.; Sette, Robert A.; and Jackson, Leigh F., 4,004,655.

Jackson, Morden A., to Maloney-Crawford Tank Corporation. Vertical flameless reboiler for reconcentrating liquid desiccant. 4,004,965, Cl. 159-27.00R.

Jacoby, Gerald B.; and Mathues, Thomas P., to General Motors Corporation. Package and kit for installation of master cylinder internal parts. 4,004,423, Cl. 60-533.000.

Jandacek, Ronald James, to Procter & Gamble Company, The. Compositions for treating hypercholesterolemia. 4,005,195, Cl. 424-180.000.

Jandacek, Ronald James; and Mattson, Fred Hugh, to Procter & Gamble Company, The. Vitaminized compositions for treating hypercholesterolemia. 4,005,196, Cl. 424-180.000.

Janssen, Marcel A. C.; and Sipido, Victor K., to Janssen Pharmaceutica N.V. Antiparasitic salicylanilide derivatives. 4,005,218, Cl. 424-304.000.

Janssen, Peter Johannes Michiel, to U.S. Philips Corporation. Device for reading a disk-shaped record carrier with time base correction. 4,005,260, Cl. 358-128.000.

Janssen Pharmaceutica N.V.: *See*—
Janssen, Marcel A. C.; and Sipido, Victor K., 4,005,218.
Marsboom, Robert P. H. M., 4,005,211.

Janssens, Wilhelmus: *See*—
Willems, Jozef Frans; and Janssens, Wilhelmus, 4,004,926.

Japan Atomic Energy Research Institute: *See*—
Machi, Sueo; Kawamura, Keita; Aoki, Shingi; Kawakami, Waichiro; and Hashimoto, Shoji, 4,004,995.

Japan Gasoline Co., Ltd.: *See*—
Kusano, Kazuto; Ando, Hiroshi; Kagami, Takashi; Uchida, Azusa; Akiyama, Noboru; Ueda, Yoshihiro; and Akiba, Yoshio, 4,005,017.

Japan Metals & Chemicals Co. Ltd.: *See*—
Fukuoka, Hiroshi; Kameyama, Teruhiko; Takahashi, Yuji; Nicho, Kenji; Misawa, Tatsuo; Inoue, Tsuneyuki; and Imai, Kimiaki, 4,004,918.

Jarret, Jacques: *See*—
Jarret, Jean; and Jarret, Jacques, 4,004,794.

Jarret, Jean; and Jarret, Jacques, to Societe d'Exploitation des Ressorts Auto-Amortisseurs Jarret. Spring formed of an elastomer mass including water. 4,004,794, Cl. 267-153.000.

Jastrzebski, Eugene C.: *See*—
Yates, Colin K.; and Jastrzebski, Eugene C., 4,005,323.

Jatczak, Chester F.; Burnett, Jesse A.; and Mohr, Terry W., to Timken Company, The. Carburized bearing members. 4,004,952, Cl. 148-39.000.

Jeanmart, Claude: *See*—
Debarre, Francois; Jeanmart, Claude; and Simon, Pierre Edouard, 4,005,212.

Jeffrey, William B., to Westinghouse Air Brake Company. Visual coupling indicator for automatic railway car couplers. 4,004,697, Cl. 213-75.00R.

Jenkins, David Conwil: *See*—
Berg, Samuel Sidney; Jenkins, David Conwil; Martin, George Christopher James; Phillipson, Ronald Frederick; and Thompson, Garth Molesdale, 4,005,217.

Jenkins, Robert T.: *See*—
Watrous, Willis George, Jr.; and Jenkins, Robert T., 4,005,455.

Jenkins, Stanley Frederick Noel, to Automotive Products Company Limited. Aircraft undercarriage with ride control means. 4,004,762, Cl. 244-104.0FP.

Jenkins, Victor Frederick: *See*—
Sampson, Keith George; Jenkins, Victor Frederick; and Bunker, Anthony John, 4,005,155.

Jennings, Don C.; and Dhondt, Roland O., to Union Oil Company of California. Superatmospheric pressure shale retorting process. 4,004,982, Cl. 201-29.000.

Jennings, Kirk E., to United States of America, Navy. Decometer. 4,005,282, Cl. 235-151.300.

Jensen, Carl F.: *See*—
Cordis, Nat, deceased; and Cordis, Gladys S., executrix, 4,004,602.

Jeppsen, Harvey I., to J.I.P. Industries, Inc. Machine for mixing aggregate and resin. 4,004,782, Cl. 259-3.000.

Jeschke, Willi, to Heidelberger Druckmaschinen Aktiengesellschaft. Sheet transfer drum for printing presses. 4,004,512, Cl. 101-410.000.

Jess, Thurman Sheldon, to Baxter Travenol Laboratories, Inc. Parenteral liquid administration set with non-air blocking filter. 4,004,587, Cl. 128-214.00R.

Jim Dandy Company, The: *See*—
Dykes, Dewey B.; Powers, E. Michael; Foster, T. Kenneth; and Rogers, Robert E., 4,005,226.

John, Ludwig: *See*—
Goodrich, David G.; and John, Ludwig, 4,004,631.

John Zink Company: *See*—
Zink, John Smith; and Goodnight, Hershel E., 4,004,875.

Johnson, Arthur D.: *See*—
Pierce, William C.; Berry, Samuel M.; and Johnson, Arthur D., 4,004,335.

Johnson, Clifford T.; McCubbin, Melvin J.; and Zulkoski, Thomas R., to United States of America, Navy. Fuze. 4,004,516, Cl. 102-24.00R.

Johnson Corporation, The: *See*—
Hildreth, Thomas L., 4,004,431.

Johnson, Curtis D.; and Skahill, Fred J., to United States of America, Army. Dual selective feed mechanism for automatic weapons. 4,004,489, Cl. 89-33.0SF.

Johnson, Daniel E. Restraining device. 4,004,583, Cl. 128-134.000.

Johnson, Edwin Samuel, to Abbott Laboratories. Treatment of prostatic hyperplasia. 4,005,194, Cl. 424-177.000.

Johnson, James B.: *See*—
Faulstich, Albert J.; Johnson, James B.; and Winkler, Gerhard B., 4,004,310.

Johnson, James Nelson, Jr. Trailer van adapted to transport compressible materials. 4,004,703, Cl. 214-82.000.

Johnson & Johnson: *See*—
Tunc, Deger C., 4,005,251.

Johnson Matthey & Co., Limited: *See*—
Knapton, Arthur George; Selman, Gordon Leslie; and Pearce, Stephen Lionel, 4,004,844.

Johnston, Gordon Boyd; and Strandberg, Hasse Eivind, to SKF Industrial Trading and Development Company, B.V. Bearing cage. 4,004,840, Cl. 308-201.000.

Jones, Billy Joe; Linnstaedter, Donald James; and Monajjem, Freydoun, to General Tire & Rubber Company, The. Method and apparatus for producing better balanced tread components in pneumatic tires. 4,004,958, Cl. 156-128.00R.

Jones, J. Paul, to Procter & Gamble Company, The. Laundering adjunct. 4,005,029, Cl. 252-99.000.

Jones, Lloyd K.; and Yanov, David A., to Elk Manufacturing Company, Inc. Plug valve. 4,004,775, Cl. 251-310.000.

Jones, Norman Stewart, to Pneupac Limited. Gas valve mechanisms. 4,004,603, Cl. 137-107.000.

Jones, Philip Graham: *See*—
Clifford, David Victor; Bell, Stephen William; Gordon, Stuart; and Jones, Philip Graham, 4,004,523.

Jordan, Larry L.: *See*—
Dost, Richard W.; Hudson, James L.; and Jordan, Larry L., 4,004,955.

Jorg, Albert: *See*—
Pichler, Peter; and Jorg, Albert, 4,004,381.

Joseph, Craig L.; Caterina, Fred J.; and Cremer, Hans H., to FMC Corporation. Multi-engine, articulated vehicle apparatus. 4,004,648, Cl. 180-14.00R.

Joynson, Reuben E.; Mundy, Joseph L.; and Banerji, Ranan, to General Electric Company. Pattern recognition machine for analyzing line orientation. 4,005,385, Cl. 340-146.3AE.

K-tel International, Inc.: *See*—
Koblick, Jeffrey M., 4,004,355.

Kabanov, Nikolai Pavlovich; Schukin, Vitaly Sergeevich; Knyazev, Jury Alexeevich; Makhalov, Sergei Fedorovich; Popov, Mikhail Ivanovich; Savonichev, Dmitry Nikolaevich; Shepelev, Dmitry Nikolaevich; Suvorov, Vladimir Nikolaevich; and Chalov, Vladimir Pavlovich. Apparatus for removal of glass sheet flash. 4,004,723, Cl. 225-103.000.

Kabushiki Kaisha Daini Seikosha: *See*—
Kawamata, Toshiaki, 4,004,410.

Kabushiki Kaisha Hayashibara Seibutsukagaku Kenkyujo: *See*—
Kato, Koso; and Nomura, Tatsuo, 4,004,977.

Kabushiki Kaisha Suwa Seikosha: *See*—
Fujita, Kinji, 4,004,407.
Shibata, Shin; and Oguchi, Kikuo, 4,005,321.
Yamazaki, Yoshio, 4,004,848.

Kabushiki Kaisha Toyota Chuo Kenkyusho: *See*—
Masaki, Hideyuki, 4,004,937.

Kaeding, Heinz; and Nicolas, Alexandros, to Hauni-Werke Korber & Co., KG. Method and apparatus for classifying cigarettes or the like. 4,004,593, Cl. 131-21.00R.

Kagami, Takashi: *See*—
Kusano, Kazuto; Ando, Hiroshi; Kagami, Takashi; Uchida, Azusa; Akiyama, Noboru; Ueda, Yoshihiro; and Akiba, Yoshio, 4,005,017.

Kaiser Aluminum & Chemical Corporation: *See*—
Dorsey, Geoffrey A., Jr., 4,004,951.
Goodrich, David G.; and John, Ludwig, 4,004,631.

Kajimoto, Hikokusu; and Shimada, Takafumi, to Mitsubishi Jukogyo Kabushiki Kaisha. Self-cleaning type stirring apparatus. 4,004,785, Cl. 259-104.000.

Kalen, Bodo, to Emtrol Corporation. Cyclone separator gas tube heat dissipator. 4,004,898, Cl. 55-267.000.

Kali-Chemie Aktiengesellschaft: *See*—
Fernschild, Gunter; Rudolph, Werner; and Massonne, Joachim, 4,005,176.
Musall, Reimar; and Wolsing, Wilhelm, 4,004,888.
Rudolph, Werner; and Massonne, Joachim, 4,005,137.
Weidenbach, Guenther; Koepernik, Karl Hermann; and Braeutigam, Hans, 4,005,177.

Kalninsh, Arvid Janovich: *See*—
Pormale, Milda Jaovna; Kashkina, Nadezhda Alexandrovna; Kalninsh, Arvid Janovich; Sergeeva, Varvara Nikolaevna; Surna, Janis Alexandrovich; Shusters, Janis; Melzobs, Modris Jaowich; Mikazhan, Waldis Danielowich; Purwinsh, Indulis Waldowich; Skutelis, Antons Petrowich; and Liepinsh, Martinsh Aleksandrowich, 4,005,070.

Kamata, Tadaaki: *See*—
Utsumi, Isamu; Endo, Tomio; Kamata, Tadaaki; and Ando, Masayasu, 4,005,200.

Kamaya, Naoki, to Sony Corporation. Tape cassette. 4,004,752, Cl. 242-198.000.

Kameyama, Teruhiko: *See*—
Fukuoka, Hiroshi; Kameyama, Teruhiko; Takahashi, Yuji; Nicho, Kenji; Misawa, Tatsuo; Inoue, Tsuneyuki; and Imai, Kimiaki, 4,004,918.

Kaminsky, Manfred S.; Das, Santosh K.; and Rossing, Thomas D., to United States of America, Energy Research and Development Administration. Method and means of reducing erosion of components of plasma devices exposed to helium and hydrogen isotope radiation. 4,004,890, Cl. 29-182.300.

Kanazawa, Shigenori: *See*—
Kato, Masumi; Kanazawa, Shigenori; and Oshikawa, Kiyomitsu, 4,004,829.

Kandel, Walter. Multiple strip garment with stitched tape border and method of manufacturing same. 4,004,296, Cl. 2-211.000.

Kane, Richard E.; and LeRow, Charles E., Jr., to Westinghouse Electric Corporation. Multi-phase gas-type circuit-interrupter substitution modular construction. 4,005,345, Cl. 317-103.000.

Kane, Walter Harold, to Webster Spring Co. Inc. Box spring assembly. 4,004,304, Cl. 5-267.000.

Kanebo, Ltd.: *See*—
Utsumi, Isamu; Endo, Tomio; Kamata, Tadaaki; and Ando, Masayasu, 4,005,200.

Kaneko, Haruo; Katagiri, Yoshio; and Yano, Kaoru, to Nippon Electric Company, Ltd. Digital-analog converter. 4,005,406, Cl. 340-347.0DA.

Kaneko, Takeo, to Sony Corporation. Signal reproducing systems employing a semiconductive light source. 4,005,259, Cl. 358-128.000.

Kang, Jung Wong: *See*—
Lawson, David Francis; and Kang, Jung Wong, 4,005,248.

Kao Soap Co., Ltd.: *See*—
Ito, Yoshio; and Mashiko, Toshio, 4,005,182.

Kaplan, Jean-Pierre; and Kyburz, Emilio, to Hoffmann-La Roche Inc. Substituted 10-ethynyldibenzo[b,f]thiepins and dibenz[b,f]oxepins. 4,005,105, Cl. 260-327.00B.

Karass, Thomas J. Hook and hook assembly using a sling of band material. 4,004,770, Cl. 248-323.000.

Karim, Sultanali M. M. Use of prostaglandins to induce menstruation. 4,005,221, Cl. 424-317.000.

Kashkina, Nadezhda Alexandrovna: *See*—
Pormale, Milda Jaovna; Kashkina, Nadezhda Alexandrovna; Kalninsh, Arvid Janovich; Sergeeva, Varvara Nikolaevna; Surna, Janis Alexandrovich; Shusters, Janis; Melzobs, Modris Jaowich; Mikazhan, Waldis Danielowich; Purwinsh, Indulis Waldowich; Skutelis, Antons Petrowich; and Liepinsh, Martinsh Aleksandrowich, 4,005,070.

Kaspers, Helmut: *See*—
Buchel, Karl Heinz; Kramer, Wolfgang; Kaspers, Helmut; and Scheinpflug, Hans, 4,005,083.

Katagiri, Yoshio: *See*—
Kaneko, Haruo; Katagiri, Yoshio; and Yano, Kaoru, 4,005,406.

Kato, Akinori: *See*—
Akatsuka, Takeaki; Kato, Akinori; Kojima, Teiryo; Inaba, Sinji; and Higashino, Kohichi, 4,005,392.

Kato, Hisayoshi; and Ueno, Ryuhji, to Nihon Jescoal Industry Co., Ltd. Water cultivation method. 4,004,369, Cl. 47-62.000.

Kato, Koso; and Nomura, Tatsuo, to Kabushiki Kaisha Hayashibara Seibutsukagaku Kenkyujo. Method for purifying *pullulan*. 4,004,977, Cl. 195-31.00P.

Kato, Masumi; Kanazawa, Shigenori; and Oshikawa, Kiyomitsu, to Nippondenso Co., Ltd. Passive seat belt system. 4,004,829, Cl. 280-745.000.

Kato, Shoichi: *See*—
Aoki, Yukio; Wakita, Shizuo; Kato, Shoichi; and Ishida, Shuichi, 4,005,148.

Kato, Yukio. Breeding aquarium having filtering chamber therein. 4,004,551, Cl. 119-5.000.

Kaufholz, Frank H., Jr., to Computer Peripherals, Inc. Transducer head positioning apparatus. 4,005,492, Cl. 360-105.000.

Kaufman, Samuel. Eyelet arrangement for pools. 4,004,301, Cl. 4-172.000.

Kaufman, William. Machine for the multiple grading of patterns from a master pattern. 4,004,346, Cl. 33-17.00A.

Kawakami, Waichiro: *See*—
Machi, Sueo; Kawamura, Keita; Aoki, Shingi; Kawakami, Waichiro; and Hashimoto, Shoji, 4,004,995.

Kawamata, Toshiaki, to Kabushiki Kaisha Daini Seikosha. Fluid-tight watchcase and improved ring gasket for the same. 4,004,410, Cl. 58-90.00R.

Kawamura, Keita: *See*—
Machi, Sueo; Kawamura, Keita; Aoki, Shingi; Kawakami, Waichiro; and Hashimoto, Shoji, 4,004,995.

Kawasaki, Masahiro: *See*—
Mori, Chiharu; and Kawasaki, Masahiro, 4,004,853.

Kawulka, Paul: *See*—
Veltman, Herbert; Mould, Geoffrey James Julien; and Kawulka, Paul, 4,004,991.

Kebets, Leonid Nikolaevich: *See*—
Gavrilov, Anatoly Nikolaevich; Godin, Eduard Moiseevich; Kebets, Leonid Nikolaevich; Beregovoi, Ivan Zakharovich; Matskevich, Vladimir Ivanovich; Korf, Yakov Osherovich; and Dorofeev, Alexandr Grigorievich, 4,004,420.

Keel, Beat G.: *See*—
Hunnicutt, Roger; and Keel, Beat G., 4,005,479.

Keeling, Kermit B., Sr., to General Electric Company. Adjustable fastening means between related members. 4,004,570, Cl. 126-214.00B.

Keeton, J. Herbert. Method and a panel for pre-fabricating buildings. 4,004,391, Cl. 52-584.000.

Keizer, Eugene Orville, to RCA Corporation. Recording apparatus and methods for a color picture/sound record. 4,005,474, Cl. 358-4.000.

Kellar, Paul Roderick Noel: *See*—
Michael, Peter Colin; and Kellar, Paul Roderick Noel, 4,005,410.

Kelly, Donald V. Frameless sliding window assembly. 4,004,629, Cl. 160-90.000.

Kelly, Peter Bernard: *See*—
Davis, Walter Thomas; and Kelly, Peter Bernard, 4,005,239.

Kelmers, A. Donald: *See*—
Bennett, Melvin R.; Bamberger, Carlos E.; and Kelmers, A. Donald, 4,005,178.

Kennebeck, William: *See*—
Ikrath, Kurt; Kennebeck, William; Shaffer, Edward C.; and Pingitore, Peter J., 4,005,429.

Kennecott Copper Corporation: *See*—
Pemsler, J. Paul; and Litchfield, John K., 4,005,173.

Kennedy, John B., Jr.: *See*—
Rarey, Kenneth W.; and Kennedy, John B., Jr., 4,004,508.

Kenney, Michael John, to Dunlop Limited. Conveyor belting. 4,004,467, Cl. 74-233.000.

Keough, Laurence J., to Texas Instruments Incorporated. Electrical contact member having low electrical resistance. 4,005,299, Cl. 200-159.00B.

Keske, Frank E., to Caterpillar Tractor Co. Differential with spherical bearing supported pinions. 4,004,471, Cl. 74-714.000.

Ketobi Associates: *See*—
Cowans, Kenneth W., 4,004,421.

Kevorkian, Victor: *See*—
Cumings, Francis J.; and Kevorkian, Victor, 4,004,893.

Key, William H.: *See*—
Fowler, John T.; and Key, William H., 4,004,348.

Kidratschky, Hermann: *See*—
Wagner, Alfred; and Kidratschky, Hermann, 4,005,255.

Kiemle, Horst, to Siemens Aktiengesellschaft, DT. Holographic storage device. 4,005,394, Cl. 340-173.0LM.

Kienlen, Loren C.: *See*—
Beard, Wallace F.; Poppler, Jack H.; and Kienlen, Loren C., 4,004,372.

Kienzle, Frank; and Rosen, Perry, to Hoffmann-La Roche Inc. 2H-Cyclopenta(b)furan-2-ones. 4,005,110, Cl. 260-343.30R.

Kienzle Uhrenfabriken GmbH: *See*—
Siefert, Roland; Seckinger, Hans; and Krosche, Herbert, 4,004,408.

Kierstead, Richard Wightman: *See*—
Guthrie, Robert William; and Kierstead, Richard Wightman, 4,005,086.

Kiess, Helmut Gustav: *See*—
Kleinknecht, Hans Peter; and Kiess, Helmut Gustav, 4,005,436.

Kikuchi, Shintaro: *See*—
Yurugi, Shojiro; and Kikuchi, Shintaro, 4,005,201.

Kikuchi, Yoshikazu: *See*—
Suzuki, Hirotsugu; Ogawa, Yo; Kikuchi, Yoshikazu; and Kitazawa, Shin-ichi, 4,004,406.

Kilthau, Gustave F.; and Loftin, Diana R., to Data Diagnostic Corporation. Diagnostic test method. 4,005,187, Cl. 424-1.500.

Kind, Dieter: *See*—
Hartel, Hagen, 4,005,340.

King, Clarence J., to Straits Steet & Wire Co. Detachable rack anchor. 4,004,526, Cl. 108-114.000.

King, Edmond B.: *See—*
Hummel, Frank, Jr.; and King, Edmond B., 4,004,612.
Kinoshita, Mototaka; Sekiguchi, Yoshimitu; and Ando, Susumu, to Lion Fat & Oil Co., Ltd. Method of treating waste water containing surfactant and heavy metals. 4,005,009, Cl. 210-44.000.
Kinstedt, George Carl, to Procter & Gamble Company, The. Organosilane-containing anionic detergent composition. 4,005,025, Cl. 252-89.00R.
Kish, Arthur S., to Murray Corporation. Suction throttling valve. 4,004,608, Cl. 137-510.000.
Kishino, Shigeo; Kudamatsu, Akio; and Sumi, Shozo, to Bayer Aktiengesellschaft. Combating insects, acarids and nematodes with S-alkoxyethyl-phenyl-di- and tri-thiophosphonic acid esters. 4,005,197, Cl. 424-216.000.
Kiszely, Gyorgy: *See—*
Fabry, Gyorgy; Takacs, Istvan; and Kiszely, Gyorgy, 4,004,609.
Kitajima, Tadayuki: *See—*
Ito, Yoshio; Kitajima, Tadayuki; and Touyama, Yoshikuni, 4,004,714.
Kitazawa, Shin-ichi: *See—*
Suzuki, Hirotsugu; Ogawa, Yo; Kikuchi, Yoshikazu; and Kitazawa, Shin-ichi, 4,004,406.
Klauke, Erich: *See—*
Sirrenberg, Wilhelm; Schramm, Jurgen; Klauke, Erich; and Hammann, Ingeborg, 4,005,223.
Kleid, Robert Eugene, to Pitney-Bowes, Inc. Sealing machine. 4,004,962, Cl. 156-475.000.
Klein, Willi: *See—*
Rocholl, Hans; and Klein, Willi, 4,004,659.
Kleinknecht, Hans Peter; and Kiess, Helmut Gustav, to RCA Corporation. Apparatus for making a recording of an electrostatic charge pattern. 4,005,436, Cl. 346-153.000.
Klepper-Werke: *See—*
Hermann, Franz, 4,004,307.
Klip, Johan, to Konijn Machinebouw B.V.; and Bagger-En Constructiebedrijf Johan Klip B.V. Mouthpiece for a suction dredger. 4,004,359, Cl. 37-66.000.
Klochko, Viktor Alexandrovich: *See—*
Yakshin, Alexandr Sergeevich; Novikov, Oleg Nikolaevich; Grechinsky, Dmitry Alexeevich; Klochko, Viktor Alexandrovich; and Rygalin, Viktor Georgievich, 4,004,450.
Klockner-Humboldt-Deutz Aktiengesellschaft: *See—*
Stern, Hans, deceased; and Strauss, Werner, 4,004,615.
Klotzer, Wilhelm: *See—*
Bretschneider, Hermann; Klotzer, Wilhelm; Bader, Gunther; and Lutz, August, 4,005,100.
Klug, Robert F., to Dale Electronics, Inc. Slide potentiometer. 4,005,381, Cl. 338-119.000.
Knapton, Arthur George; Selman, Gordon Leslie; and Pearce, Stephen Lionel, to Johnson Matthey & Co., Limited. Electrical connector. 4,004,844, Cl. 339-118.00R.
Knight, Charles E., Jr.: *See—*
Dritt, William S.; Gerth, Howard L.; Knight, Charles E., Jr.; and Pardue, Robert M., 4,005,233.
Knobel, David. Vibratory massage apparatus. 4,004,580, Cl. 128-32.000.
Knoll, Heinz W.: *See—*
Breitschwerdt, Werner; and Knoll, Heinz W., 4,004,821.
Knop, Hans-Georg, to Dr. -Ing. Rudolf Hell GmbH. Method for improving sharpness when recording half-tone pictures by modulating a sharpness signal. 4,005,475, Cl. 358-80.000.
Knothe, Erich; Melcher, Franz Josef; and Berg, Christoph, to Sartorius-Werke GmbH (und. vorm. Gottinger Prazisionswaagenfabrik GmbH). Electromagnetically compensated balance or dynamometer. 4,004,458, Cl. 73-141.00R.
Knowles, William S.; Sabacky, Milton J.; and Vineyard, Billy D., to Monsanto Company. L-Dopa process and intermediates. 4,005,127, Cl. 260-479.00R.
Knyazev, Jury Alexeevich: *See—*
Kabanov, Nikolai Pavlovich; Schukin, Vitaly Sergeevich; Knyazev, Jury Alexeevich; Makhalov, Sergei Fedorovich; Popov, Mikhail Ivanovich; Savonichev, Dmitry Nikolaevich; Shepelev, Dmitry Nikolaevich; Suvorov, Vladimir Nikolaevich; and Chalov, Vladimir Pavlovich, 4,004,723.
Kobayashi, Takumi, to Asahi Kogaku Kogyo Kabushiki Kaisha. Interlocked manual stop-down and mirror-up mechanism for single lens reflex camera. 4,005,459, Cl. 354-156.000.
Koblick, Jeffrey M., to K-tel International, Inc. Shoe device and method of attaching a strap to a shoe member. 4,004,355, Cl. 36-122.000.
Koch, Franklin O., Jr.: *See—*
Nerstad, Karl A.; Koch, Franklin O., Jr.; and Chadwick, Curtis E., III, 4,004,670.
Koch, Frederick William; and Musser, Jerry Lee, to Lubrizol Corporation, The. Hydroxy containing phosphonates. 4,005,159, Cl. 260-953.000.
Koch, Werner, to Sandoz Ltd. Substituted 2-imidazolin-5-ones. 4,005,080, Cl. 260-240.00F.
Koepernik, Karl Hermann: *See—*
Weidenbach, Guenther; Koepernik, Karl Hermann; and Braeutigam, Hans, 4,005,177.
Kohkoku Chemical Industry Co., Ltd.: *See—*
Sogabe, Yoji; Edamatsu, Tetsuo; and Oka, Takashi, 4,004,828.
Kohnen, Heinrich: *See—*
Eichenhofer, Kurt-Wilhelm; Schliebs, Reinhard; Brandl, Hermann; and Kohnen, Heinrich, 4,005,179.
Kojima, Teiryo: *See—*
Akatsuka, Takeaki; Kato, Akinori; Kojima, Teiryo; Inaba, Sinji; and Higashino, Kohichi, 4,005,392.
Kolarik, Michael J.: *See—*
Emery, Alden H.; Lim, Henry C.; and Kolarik, Michael J., 4,004,980.
Koller, Thomas J., to Machlett Laboratories, Incorporated, The. Rotating anode target structure. 4,005,322, Cl. 313-60.000.
Kolling, Heinrich; Thomas, Herbert; Widdig, Arno; and Wollweber, Hartmund, to Bayer Aktiengesellschaft. Substituted phenylisothiourcas and processes for their preparation and use. 4,005,123, Cl. 260-470.000.
Kollonitsch, Janos, to Merck & Co., Inc. Fluorination of organic compounds. 4,004,996, Cl. 204-158.0HA.
Kondo, Yutaka; and Usugi, Takashi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Gas bag safety apparatus. 4,004,827, Cl. 280-742.000.
Kondur, Nicholas, Jr., to LRC, Inc. Wire matrix print head. 4,004,671, Cl. 197-1.00R.
Kong, Carlito Maristela; Wark, Emerson Lee; and Ferdelman, Donald Clarence, to General Motors Corporation. Humidifier kit for room air conditioner. 4,004,432, Cl. 62-262.000.
Konijn Machinebouw B.V.: *See—*
Klip, Johan, 4,004,359.
Konopnicki, Daniel T.: *See—*
Brown, Alfred; Wu, Ching H.; and Konopnicki, Daniel T., 4,004,636.
Konstruktiewerkhuizen DeMets N.V.: *See—*
De Mets, Albert, 4,004,873.
Kooi, Else: *See—*
Le Can, Claude Jan Principe Frederic; Kooi, Else; and Steinmaier, Walter, 4,005,453.
Kopke, Helmut; Hartmann, Hans-Joerg; Mayer, Dieter; and Motz, Herbert, to BASF Aktiengesellschaft. Magnetic recording medium containing lubricants. 4,005,242, Cl. 428-425.000.
Koppers Company, Inc.: *See—*
Calistrat, Michael M., 4,004,433.
Edgar, William D.; Sustarsic, John D.; and Adamsky, Allan F., 4,004,985.
Korf, Yakov Osherovich: *See—*
Gavrilov, Anatoly Nikolaevich; Godin, Eduard Moiseevich; Kebets, Leonid Nikolaevich; Beregovoi, Ivan Zakharovich; Matskevich, Vladimir Ivanovich; Korf, Yakov Osherovich; and Dorofeev, Alexandr Grigorievich, 4,004,420.
Kortschot, Cornelis; and Miller, James Joseph, to Corporate Foods Limited. Process for cooked potato products. 4,005,139, Cl. 426-550.000.
Kosaka, Katuaki; Ueno, Zene; and Nagaoka, Tadahiko, to Nissan Motor Co., Ltd. Fuel converting method and apparatus. 4,004,554, Cl. 123-3.000.
Kossiakoff, Alexander; and Austin, James R., to United States of America, Navy. Automated radar data processing system. 4,005,415, Cl. 343-5.0VQ.
Koster, Roland; and Bellut, Hans, to Studiengesellschaft Kohle m.b.H. Process for reacting trialkyl boranes with compounds containing protons. 4,005,132, Cl. 260-502.300.
Kosuge, Momotoshi. Building structure using concrete blocks. 4,004,385, Cl. 52-259.000.
Kosugi, Soichiro, to Yamaha, Hatsudoki Kabushiki Kaisha. Piston-crank mechanism for internal combustion engines. 4,004,469, Cl. 74-604.000.
Koudelka, Vojtech: *See—*
Sandera, Josef; Calabek, Milan; Cenek, Miroslav; Koudelka, Vojtech; Kouril, Oldrich; Malik, Jiri; and Vanacek, Josef, 4,004,944.
Kouril, Oldrich: *See—*
Sandera, Josef; Calabek, Milan; Cenek, Miroslav; Koudelka, Vojtech; Kouril, Oldrich; Malik, Jiri; and Vanacek, Josef, 4,004,944.
Kovar, Robert F.; and Arnold, Fred E., to United States of America, Air Force. Ethynyl-substituted aromatic ortho diamines and method of synthesis. 4,005,144, Cl. 260-578.000.
Kowalski, Charles J., to Charles Beseler Company. Photographic processing drum and method for using. 4,005,463, Cl. 354-307.000.
Kozakai, Asao: *See—*
Ishikawa, Masakazu; Ota, Takaaki; Ishigami, Noriakira; and Kozakai, Asao, 4,005,401.
Kraft, Joseph K.; Sette, Robert A.; and Jackson, Leigh F., to Westinghouse Electric Corporation. Elevator system including door operator having an enclosure which forms track for door rollers. 4,004,655, Cl. 187-52.00R.
Kraft, Joseph K., to Westinghouse Electric Corporation. Escalator with non-jaming step. 4,004,676, Cl. 198-326.000.
Krall, Thomas J.; and Uhlig, Albert R., to Owens-Illinois, Inc. Apparatus for blow molding plastic articles. 4,004,872, Cl. 425-326.00B.
Krallinger, Robert E.; Ignatjev, Vladimir; Rand, Ralph K.; and Costello, Matthew Joseph, to Graphic Sciences, Inc. Facsimile transceiver. 4,005,257, Cl. 358-256.000.
Kramer, Wolfgang: *See—*
Buchel, Karl Heinz; Kramer, Wolfgang; Kaspers, Helmut; and Scheinpflug, Hans, 4,005,083.
Kraska, John L., to National Can Corporation. Electrocoating apparatus and method. 4,005,000, Cl. 204-181.000.
Krause, Erich: *See—*
Schieber, Hans; Radl, Franz; Krause, Erich; and Schimko, Reinhold, 4,004,437.
Krehbiel, Vivian D., to Kreonite, Inc. Apparatus and method for processing photographic film. 4,005,464, Cl. 354-322.000.

Kreiger, John W., to Bethlehem Steel Corporation. Method for agglomerating wet-collected fume for use in metallurgical furnaces and agglomerates produced thereby. 4,004,916, Cl. 75-3.000.

Krenzer, John, to Velsicol Chemical Corporation. 1-Thiadiazolyl-6-acyloxytetrahydropyrimidinone herbicides. 4,004,912, Cl. 71-90.000.

Kreonite, Inc.: *See*—
Krehbiel, Vivian D., 4,005,464.

Krespan, Carl George, to Du Pont de Nemours, E. I., and Company. Products from the reaction of sulfur trioxide with acyclic internal vic-dialkoxypolyfluoroalkenes. 4,005,104, Cl. 260-327.00H.

Kressel, Henry: *See*—
Martinelli, Ramon Ubaldo; and Kressel, Henry, 4,005,451.

Kristensson, Nils Lars Ove, to Landstingens Inkopscentral Lic, Ekonomisk Forening. Chair with tiltable spring biased back-rest. 4,004,836, Cl. 297-354.000.

Kritzler, Helmuth: *See*—
Bohm, Walter; Kritzler, Helmuth; and Neumann, Lutz, 4,005,143.

Krocheski, Thomas L.: *See*—
Fosler, Dick E., Jr.; and Krocheski, Thomas L., 4,005,395.

Krogsrud, Harald, to Elkem-Spigerverket. Apparatus for gas collection in open electric smelting furnaces. 4,005,252, Cl. 13-33.000.

Krol, Leszek; Gierek, Adam; Skoczkowski, Kazimierz; Bednarczyk, Stanislaw; Mandelka, Pawel; Nowak, Teodor; and Krzemien, Eugeniusz, to Huta Kosciuszko, Frzedsiebiorstwo Panstwowe. Plate-type radiator suitable for shaft furnaces, particularly for blast furnaces, and a method for fabrication of this radiator. 4,004,790, Cl. 266-193.000.

Krosche, Herbert: *See*—
Siefert, Roland; Seckinger, Hans; and Krosche, Herbert, 4,004,408.

Krzemien, Eugeniusz: *See*—
Krol, Leszek; Gierek, Adam; Skoczkowski, Kazimierz; Bednarczyk, Stanislaw; Mandelka, Pawel; Nowak, Teodor; and Krzemien, Eugeniusz, 4,004,790.

Kubicek, Donald H., to Phillips Petroleum Company. Mercaptans by hydrogen sulfide-cleavage of organic sulfides in presence of carbon disulfide. 4,005,149, Cl. 260-609.00R.

Kudamatsu, Akio: *See*—
Kishino, Shigeo; Kudamatsu, Akio; and Sumi, Shozo, 4,005,197.

Kugler, Jindrich; Dvorak, Alfred; and Elliott, Charles John, to Northern Telecom Limited. Protection circuit for magnetically controlled d-c to d-c converter. 4,005,352, Cl. 321-19.000.

Kukolja, Stjepan P.; and Lammert, Steven R., to Eli Lilly and Company. Process for cleaving an imido side chain from penicillins and cephalosporins. 4,005,074, Cl. 260-239.100.

Kump, Wilhelm: *See*—
Bickel, Hans; and Kump, Wilhelm, 4,005,077.

Kundert, Robert L., to Focus/Board Inc. Reconstructible karate board. 4,004,799, Cl. 272-8.00N.

Kunstle, Gerhard; and Siegl, Herbert, to Wacker-Chemie GmbH. Process for making dialkoxiboracetylacetonate containing mixtures. 4,005,120, Cl. 260-462.00R.

Kupchan, S. Morris; and Court, William A., to Research Corporation. Novel anti-leukemic diterpenoid triepoxides. 4,005,108, Cl. 260-343.30R.

Kupperman, Dennis I.: *See*—
Kupperman, Sam; and Kupperman, Dennis I., 4,004,597.

Kupperman, Sam; and Kupperman, Dennis I., to RB Toy Development Co. Means for supporting a strip or length of dental floss in tensioned and taut condition for ready use. 4,004,597, Cl. 132-84.00A.

Kurata, Noboru: *See*—
Kusunoki, Shigeru; Takano, Teruhisa; Yoshimura, Hirofumi; and Kurata, Noboru, 4,005,370.

Kuroiwa, Satoshi: *See*—
Tamura, Yukio; Tanaka, Yoshikazu; Kuroiwa, Satoshi; and Suzuki, Mikiji, 4,005,307.

Kurumada, Tomoyuki: *See*—
Murayama, Keisuku; Moriyama, Syoji; Yoshioka, Takao; Toda, Toshimasa; Mori, Eiko; Horiuchi, Hideo; Higashida, Susumu; Matsui, Katsuaki; Kurumada, Tomoyuki; Ohata, Noriyuki; and Ohsawa, Hisayou, 4,005,094.

Kusano, Kazuto; Ando, Hiroshi; Kagami, Takashi; Uchida, Azusa; Akiyama, Noboru; Ueda, Yoshihiro; and Akiba, Yoshio, to Japan Gasoline Co., Ltd. Contacting apparatus. 4,005,017, Cl. 210-284.000.

Kustner, Gerhard: *See*—
Zangenfeind, Helmut; and Kustner, Gerhard, 4,004,724.

Kusunoki, Shigeru; Takano, Teruhisa; Yoshimura, Hirofumi; and Kurata, Noboru, to Matsushita Electric Industrial Co., Ltd. Power supply means for magnetron. 4,005,370, Cl. 328-267.000.

Kuwano, Takeshi, to Hitachi, Ltd. Automatic record control apparatus with multichannel memory. 4,005,483, Cl. 360-69.000.

Kuzarov, Encho Janaki, to Warn Industries, Inc. Winch. 4,004,780, Cl. 254-187.400.

Kwake, John P. Double walled inflatable structures. 4,004,380, Cl. 52-2.000.

Kybe Corporation: *See*—
Beedle, John H., 4,004,317.

Kyburz, Emilio: *See*—
Kaplan, Jean-Pierre; and Kyburz, Emilio, 4,005,105.

L.S. Love & Associates Limited: *See*—
Parlette, Joseph N., 4,005,019.

Laboratoires Andre Guerbet: *See*—
Tilly, Guy; Hardouin, Michel Jean Charles; and Lautrou, Jean, 4,005,188.

Laboratorios del Dr. Esteve, S.A.: *See*—
Esteve-Subirana, Antonio, 4,005,220.

Laboy-Alvarado, Samuel. Portable bridge structure. 4,004,652, Cl. 182-118.000.

Lackner, Robert, to U.S. Philips Corporation. Recording and/or playback apparatus which prevents erasure of the synchronization track. 4,005,481, Cl. 360-60.000.

Laing, Nikolaus. Thermal prime mover. 4,004,426, Cl. 60-659.000.

Laitram Corporation, The: *See*—
Fowler, John T.; and Key, William H., 4,004,348.

Laker, Kenneth R.: *See*—
Slobodnik, Andrew J., Jr.; and Laker, Kenneth R., 4,005,378.

Lakodey, Pierre: *See*—
Mollard, Paul; and Lakodey, Pierre, 4,004,988.

Lakoma, Henry J.: *See*—
Mitchell, James P.; and Lakoma, Henry J., 4,005,295.

Lal, Joginder: *See*—
Sandstrom, Paul H.; and Lal, Joginder, 4,004,627.

Lammert, Steven R.: *See*—
Kukolja, Stjepan P.; and Lammert, Steven R., 4,005,074.

Lamprecht, Adolf, to Rowenta-Werke GmbH. Circuit for producing a spark discharge. 4,005,343, Cl. 317-96.000.

Lamy S.r.l.: *See*—
Aruanno, Angela, 4,004,746.

Lancini, Giancarlo: *See*—
Cricchio, Renato; and Lancini, Giancarlo, 4,005,076.

Landstingens Inkopscentral Lic, Ekonomisk Forening: *See*—
Kristensson, Nils Lars Ove, 4,004,836.

Lange, Karl Heinz, to Balda-Werke Photographische Gerate & Kunststoff GmbH & Co. KG. Driving device for film transport and shutter cocking lever for a camera. 4,005,461, Cl. 354-204.000.

Langheim, Franz; and Braasch, Michael, to Chemische Werke Huls Aktiengesellschaft. Method and apparatus for cushioning continuous exothermal reactions. 4,004,880, Cl. 23-230.00A.

Laponsky, Alfred B.: *See*—
Whitson, Walter J.; Laponsky, Alfred B.; and Malanoski, Raymond J., 4,004,842.

Laporte Industries Limited: *See*—
Sampson, Keith George; Jenkins, Victor Frederick; and Bunker, Anthony John, 4,005,155.

Lardner, George E.: *See*—
Mackal, Glenn H.; Lardner, George E.; and Maz, Joseph, 4,004,614.

Lark Luggage Corporation: *See*—
Pelavin, Joseph Y.; Spiegelman, Seymour; and Rastocny, John S., 4,004,664.

Larson, Dean W., to Esco Corporation. Rope bending device. 4,004,445, Cl. 72-389.000.

Larsson, Lars Goran; and Sundberg, Sture Ingemar, to Aktiebolaget Platmanufaktur. Equipment for packaging pulverized material. 4,004,398, Cl. 53-112.00A.

Lassig, Wolfgang: *See*—
Vrancken, Marcel Nicolas; and Lassig, Wolfgang, 4,004,924.

Lauber, Jean-Louis: *See*—
London, Joe F., Jr.; and Lauber, Jean-Louis, 4,004,329.

Laud, Kamlakar R.: *See*—
Logothetis, Eleftherios M.; Laud, Kamlakar R.; and Park, Kwan-suh, 4,004,452.

Laudick, Richard D. Machine for forming a locator pin. 4,004,377, Cl. 51-232.000.

Lautrou, Jean: *See*—
Tilly, Guy; Hardouin, Michel Jean Charles; and Lautrou, Jean, 4,005,188.

Law, S. Edward, to Research Corporation. Electrostatic spray nozzle system. 4,004,733, Cl. 239-3.000.

Lawrence Peska Associates, Inc.: *See*—
Eason, Donald, 4,004,312.
Giarritta, Ninfa R., 4,004,690.
Olivier, Lynn, 4,004,722.

Lawson, David Francis; and Kang, Jung Wong, to Firestone Tire & Rubber Company, The. Smoke-inhibited polymer compositions. 4,005,248, Cl. 526-20.000.

Leander, Bo Ingvar, to Aktiebolaget Ljungmans Verkstader. Apparatus for transferring information between electronic display devices and means for transmitting and receiving information and for supplying operating current to the electronic display devices. 4,005,412, Cl. 340-380.000.

Le Can, Claude Jan Principe Frederic; Kooi, Else; and Steinmaier, Walter, to U.S. Philips Corporation. Semiconductor device with isolated circuit elements and method of making. 4,005,453, Cl. 357-49.000.

Ledley, Robert S., to Georgetown University. Diagnostic X-ray systems. 4,005,311, Cl. 250-445.00T.

Ledru, Pierre, to Rhone-Poulenc Industries. Unsaturated polyester with polyimide-ammonia prepolymers as thermosetting laminate. 4,004,959, Cl. 156-331.000.

Lee, Richard J., to Standard Oil Company (Indiana). Oil-soluble reaction products of (a) a high molecular weight olefin polymer, acrylonitrile, chlorine, an amine and maleic anhydride, with (g) an aliphatic amines; and lubricant compositions containing the same. 4,005,021, Cl. 252-51.50A.

Lehr, Stanley; Coralnick, Philmore; and Blauth, Gary William, to Singer Company, The. Method and apparatus for synchronizing master and local time base systems. 4,005,266, Cl. 178-69.100.

Lemaire, Gilbert, to Saft-Societe des Accumulateurs Fixes et de Traction; and Compagnie Royale Asturienne des Mines. Method for

recovering potassium hydroxide and zinc oxide from potassium zincate solutions. 4,005,061, Cl. 423-102.000.

Lemelson, Jerome H. Electro-optical circuits and manufacturing techniques. 4,005,312, Cl. 250-551.000.

Lenherr, Markus; and Iseli, Pierre, to Mefina S.A. Time fuse. 4,004,520, Cl. 102-78.000.

Lenkey, Steven Charles. Mechanical shovels. 4,004,679, Cl. 198-509.000.

Leonhart, Xaver. Table ball game. 4,004,807, Cl. 273-41.000.

Leotromelt Corporation: *See*—
Gray, Ronald D., 4,004,793.

Lerner, David S., to Lockheed Electronics Co., Inc. Performance assurance apparatus for phased antenna array drives. 4,005,361, Cl. 324-51.000.

Lerner, David S., to Lockheed Electronics Co., Inc. R.F. power distribution network for phased antenna array. 4,005,379, Cl. 333-6.000.

LeRow, Charles E., Jr.: *See*—
Kane, Richard E.; and LeRow, Charles E., Jr., 4,005,345.

Les Fils d'Auguste Scheuchzer S.A.: *See*—
Scheuchzer, Fredy; and Buhler, Fritz, 4,004,524.

Lesk, Israel Arnold, to Motorola, Inc. Method of making silicon solar cells. 4,004,949, Cl. 148-1.500.

Leslie Metal Arts Company, Inc.: *See*—
Vander Ley, Robert J., 4,004,841.

Leszak, Edward H., to Grumman Aerospace Corporation. Process for modifying capillary grooves. 4,004,441, Cl. 72-75.000.

Le Van, Wayne P., to Van Allyn, Inc. Method and apparatus for utilizing moving traffic for generating electricity and to produce other useful work. 4,004,422, Cl. 60-533.000.

Levatter, Jeffrey I.; and Lin, Shao-Chi, to Xonics, Inc. Pulsed gas laser with low-inductance flow-through electrodes. 4,005,374, Cl. 331-94.5PE.

Levin, Gerd. Egg incubating tray with rack and slide. 4,004,552, Cl. 119-43.000.

Levy, Sidney. Magnetic imaging method for photocopying. 4,005,439, Cl. 346-74.100.

Lewalter, Jurgen: *See*—
Dunwald, Willi; Lewalter, Jurgen; and Merten, Rudolf, 4,005,056.

Lewis, Jack E.: *See*—
Walker, Walter P.; Smith, Leary W.; Cofer, Frank H., Jr.; and Lewis, Jack E., 4,005,491.

Leworthy, John Harwood: *See*—
Hall, Godfrey Stephen; and Leworthy, John Harwood, 4,004,674.

Libbey-Owens-Ford Company: *See*—
Daman, Lloyd W.; Hille, Earl A.; and Shamp, Donald E., 4,004,903.

Libit, Lawrence. Preparation of prostaglandin intermediates. 4,005,109, Cl. 260-343.30R.

Licentia Patent-Verwaltungs-G.m.b.H.: *See*—
Botzenhardt, Leonhard, 4,005,456.
Dickopp, Gerhard; Oertel, Lothar; and Frey, Wolfgang, 4,005,476.
Thieme, Klaus-Dietrich, 4,004,561.

Liepinsh, Martinsh Aleksandrowich: *See*—
Pormale, Milda Jaovna; Kashkina, Nadezhda Alexandrovna; Kalninsh, Arvid Janovich; Sergeeva, Varvara Nikolaevna; Surna, Janis Alexandrovich; Shusters, Janis; Melzobs, Modris Jaowich; Mikazhan, Waldis Danielowich; Purwinsh, Indulis Waldowich; Skutelis, Antons Petrowich; and Liepinsh, Martinsh Aleksandrowich, 4,005,070.

Ligon, Woodfin V., Jr., to General Electric Company. Apparatus for generating carrier gas-test specimen vapor mixtures for delivery into a gas chromatograph. 4,004,881, Cl. 23-232.00C.

Liljekvist, Bernt Soren; and Persson, Anders, to Sandvik Aktiebolag. Roller cutter. 4,004,644, Cl. 175-364.000.

Lim, Henry C.: *See*—
Emery, Alden H.; Lim, Henry C.; and Kolarik, Michael J., 4,004,980.

Lin, Ching San; and Smith, James Thomas, to GTE Sylvania Incorporated. Superalloys containing nitrides and process for producing same. 4,004,891, Cl. 29-182.500.

Lin, Shao-Chi: *See*—
Levatter, Jeffrey I.; and Lin, Shao-Chi, 4,005,374.

Linehan, Kevin Lawrence: *See*—
Graham, Clifford Arthur Andrew; and Linehan, Kevin Lawrence, 4,005,192.

Linnstaedter, Donald James: *See*—
Jones, Billy Joe; Linnstaedter, Donald James; and Monajjem, Freydoun, 4,004,958.

Lion Fat & Oil Co., Ltd.: *See*—
Kinoshita, Mototaka; Sekiguchi, Yoshimitu; and Ando, Susumu, 4,005,009.

Lionetti, Fabian J.; and Hunt, Stephen M., to United States of America, Navy. Method of isolating and cryopreserving human white cells from whole blood. 4,004,975, Cl. 195-1.800.

Lisiecki, Hieronim L.: *See*—
Scholin, Harold W.; and Lisiecki, Hieronim L., 4,004,497.

List, Ferdinand; Uhlenbrock, Wilfried; Wilke, Norbert; and Wember, Kurt, to Chemische Werke Huls Aktiengesellschaft. Process for recovering the mother liquor produced by the esterification of terephthalic acid with methanol. 4,005,124, Cl. 260-475.00R.

List, Helmut; and Fredericks, George, to AVL AG. Method of manufacturing multi-wire oxygen electrode. 4,004,331, Cl. 29-25.150.

Litchfield, John K.: *See*—
Pemsler, J. Paul; and Litchfield, John K., 4,005,173.

Littlejohn, Terrance V.: *See*—
Duncan, Damon H.; Herdman, Craig T.; and Littlejohn, Terrance V., 4,005,490.

Liu, Geoffrey Hao-Wen: *See*—
Ficalora, Peter J.; and Liu, Geoffrey Hao-Wen, 4,005,186.

Lockheed Aircraft Corporation: *See*—
Bunnell, Frederick E., III; and Combs, Henry G., 4,004,763.

Lockheed Electronics Co., Inc.: *See*—
Lerner, David S., 4,005,361.
Lerner, David S., 4,005,379.
Rawicz, Harris C.; Bigley, William J.; Cangiani, Gene L.; and Yohannan, Rene C., 4,004,729.

Lodding Engineering Corporation: *See*—
Beauchemin, Norman J., 4,004,969.

Loeschcke, Ingrid: *See*—
Gachde, Joachim; Gesierich, Adolf; and Loeschcke, Ingrid, 4,005,238.

Loev, Bernard: *See*—
Bender, Paul E.; and Loev, Bernard, 4,005,208.

Loftin, Diana R.: *See*—
Kilthau, Gustave F.; and Loftin, Diana R., 4,005,187.

Logan, Forrest E., to Occidental Petroleum Corporation. Intercompartment seal for rotary feeder. 4,004,336, Cl. 29-156.40R.

Logging Development Corporation: *See*—
Hamilton, Douglas D., 4,004,622.

Logothetis, Eleftherios M.; Laud, Kamlakar R.; and Park, Kwansuh, to Ford Motor Company. Air/fuel ratio sensor for air/fuel ratios in excess of stoichiometry. 4,004,452, Cl. 73-23.000.

Lohr & Bromkamp GmbH: *See*—
Rubin, Wolfgang, 4,004,435.

London, Joe F., Jr.; and Lauber, Jean-Louis, to Burlington Industries, Inc. Yarn interlacing air jet. 4,004,329, Cl. 28-1.400.

Long, William W. Isolation clamp for transmission tube. 4,004,766, Cl. 248-55.000.

Lopez, Juan: *See*—
Craig, Theodore W.; Lopez, Juan; and Henika, Richard G., 4,005,225.

Loveland, Winton, to Loveshaw Corporation, The. Automatic carton closing machine side guide rails holding mechanism providing clearance for all cartons of one alleged size with accommodation of small degrees of variances. 4,004,401, Cl. 53-374.000.

Loveshaw Corporation, The: *See*—
Loveland, Winton, 4,004,401.

LRC, Inc.: *See*—
Kondur, Nicholas, Jr., 4,004,671.

Lu, Chin H., to Xerox Corporation. Constant viscosity inks. 4,004,931, Cl. 106-30.000.

Lubrizol Corporation, The: *See*—
Koch, Frederick William; and Musser, Jerry Lee, 4,005,159.

Lucarini, Vincent Joseph: *See*—
Chang, Augustine Wei-Chun; and Lucarini, Vincent Joseph, 4,005,469.

Lucas Industries Limited: *See*—
Plant, Anthony Brian, 4,005,354.

Ludwig, Martin, to Siemens Aktiengesellschaft. Tabulator device for typewriters and the like. 4,004,675, Cl. 197-176.000.

Luehman, Kent W.: *See*—
Salesky, Emery; and Luehman, Kent W., 4,005,373.

Lukas, Helmut Hans: *See*—
Dalgleish, Jack Frank; and Lukas, Helmut Hans, 4,004,446.

Lummus Company, The: *See*—
Solomon, Stephen M.; Shaievitz, Sidney; and Marshall, Louis, 4,004,430.

Lundquist, David E.; Hoffman, Paul R.; Su, Chauchang; Sung, Benjamin T.; and Eichhardt, Steven A., to Burroughs Corporation. Liquid jet droplet generator. 4,005,435, Cl. 346-1.000.

Lundqvist, Bengt Oscar Bruno, to U.S. Philips Corporation. Arrangement in a printer. 4,004,504, Cl. 101-93.030.

Lunt, John, to Imperial Chemical Industries Limited. Method of packing media in a tower or bed. 4,005,010, Cl. 210-17.000.

Lutz, August: *See*—
Bretschneider, Hermann; Klotzer, Wilhelm; Bader, Gunther; and Lutz, August, 4,005,100.

Lutz, Paul H. Domino type game. 4,004,812, Cl. 273-137.00C.

Lynn Industries: *See*—
Canell, George; and Schotz, Larry A., 4,005,268.

Lynnworth, Lawrence C., to Panametrics, Inc. Ultrasonic measuring system with isolation means. 4,004,461, Cl. 73-194.00A.

Mabuchi, Kenichi; and Tsuchimochi, Yoshihisa, to Mabuchi Motor Co. Ltd. Battery-powered electric motor assembly. 4,005,320, Cl. 310-40.0MM.

Mabuchi Motor Co. Ltd.: *See*—
Mabuchi, Kenichi; and Tsuchimochi, Yoshihisa, 4,005,320.

Mach, Wolfgang; and Scheuermann, Horst, to BASF Aktiengesellschaft. Fluorescent dyes. 4,005,111, Cl. 260-345.200.

Machi, Sueo; Kawamura, Keita; Aoki, Shingi; Kawakami, Waichiro; and Hashimoto, Shoji, to Ebara Manufacturing Co., Ltd.; and Japan Atomic Energy Research Institute. Process for removing nitrogen oxides and sulfur dioxide from effluent gases. 4,004,995, Cl. 204-157.10H.

Machlett Laboratories, Incorporated, The: *See*—
Koller, Thomas J., 4,005,322.

Mackal, Glenn H.; Lardner, George E.; and Maz, Joseph, to Halkey-Roberts Corporation. Tether for captive plug of inflation device. 4,004,614, Cl. 138-89.200.

Macke, Thomas F., to Hydrabind, Inc. Caliper-stitch and trim machine. 4,004,796, Cl. 271-94.000.

MacKenzie, Burton Thornley, Jr., to General Electric Company. Pressureless cure system for chemically cross-linking ethylene containing

polymers, and product formed thereby. 4,005,254, Cl. 174-110.0PM.

MacPherson, Alastair George, to Burroughs Corporation. Peripheral interrupt priority resolution in a micro program data processor having plural levels of subinstruction sets. 4,005,391, Cl. 340-172.500.

Maddagiri, Aswath, to Bechtel International Corporation. Method for limiting back pressure on steam turbine. 4,004,424, Cl. 60-646.000.

Maddock, Robert Brent: *See*—
Purton, Robert Merrill; and Maddock, Robert Brent, 4,004,613.

Mader, Helmut; Fekl, Werner; and Schultis, Klaus, to J. Pfrimmer & Co. Infusion solution for parenteral feeding. 4,005,190, Cl. 424-127.000.

Magdo, Ingrid E.; and Magdo, Steven, to International Business Machines Corporation. Semiconductor resistor having a high value resistance for use in an integrated circuit semiconductor device. 4,005,471, Cl. 357-51.000.

Magdo, Steven: *See*—
Magdo, Ingrid E.; and Magdo, Steven, 4,005,471.

Magnenet, Jean Georges, to Compagnie Honeywell Bull (Societe Anonyme). Electromagnetic striker mechanism for a printer. 4,004,505, Cl. 101-93.480.

Mago nee Karacsony, Erzsebet; Borsi, Jozsef; Csanyi, Endre; Pik, Katalin; and Wolf, Lajos, to Richter Gedeon Vegyeszeti Gyar Rt. Compounds with ergoline skeleton. 4,005,089, Cl. 260-285.500.

Magosch, Karl-Heinz; and Ruter, Jorn, to Chemische Werke Huls Aktiengesellschaft. Process for the preparation of pilling-resistant fiber products from polyesters. 4,004,878, Cl. 8-115.500.

Maher, George G., to United States of America, Agriculture. Foamed and solid rubber-starch graft copolymer compositions and method of preparation. 4,005,040, Cl. 260-17.4GC.

Mailen, James C.: *See*—
Horner, Donald E.; Mailen, James C.; and Posey, Franz A., 4,004,993.

Main, John A., to Motor Wheel Corporation. Wheel cover with snap on fastener. 4,004,837, Cl. 301-37.00P.

Makarov, Evgeny Fredovich: *See*—
Alexandrov, Anatoly Julianovich; Grushko, July Sergeevich; Makarov, Evgeny Fredovich; Mishin, Konstantin Yakovlevich; and Baltrunas, Daljus Antanas Jono, 4,004,970.

Makhalov, Sergei Fedorovich: *See*—
Kabanov, Nikolai Pavlovich; Schukin, Vitaly Sergeevich; Knyazev, Jury Alexeevich; Makhalov, Sergei Fedorovich; Popov, Mikhail Ivanovich; Savonichev, Dmitry Nikolaevich; Shepelev, Dmitry Nikolaevich; Suvorov, Vladimir Nikolaevich; and Chalov, Vladimir Pavlovich, 4,004,723.

Malanoski, Raymond J.: *See*—
Whitson, Walter J.; Laponsky, Alfred B.; and Malanoski, Raymond J., 4,004,842.

Malik, Jiri: *See*—
Sandera, Josef; Calabek, Milan; Cenek, Miroslav; Koudelka, Vojtech; Kouril, Oldrich; Malik, Jiri; and Vanacek, Josef, 4,004,944.

Malik, Stanislaus. Apparatus for collecting balls. 4,004,806, Cl. 273-29.00R.

Mallick, George, Jr.: *See*—
Berger, Robert L.; Hailey, William H.; Mallick, George, Jr.; Mannbeck, Donald H.; and Weight, Wilber J., 4,005,365.

Mallory, Herbert D.; and Marquardt, Frank R., to United States of America, Navy. Sequential jet shaped charge. 4,004,515, Cl. 102-24.0HC.

Maloney-Crawford Tank Corporation: *See*—
Jackson, Morden A., 4,004,965.

Mammoth Plastics, Inc.: *See*—
Crisci, Victor Eugene, 4,004,710.

Manchester, Lester F. Signaling fishing rod holder. 4,004,365, Cl. 43-17.000.

Mandelka, Pawel: *See*—
Krol, Leszek; Gierek, Adam; Skoczkowski, Kazimierz; Bednarczyk, Stanislaw; Mandelka, Pawel; Nowak, Teodor; and Krzemien, Eugeniusz, 4,004,790.

Mandusky, Jack C.; and Riddle, Neville L., to Hoover Ball and Bearing Company. Spring assembly and boxspring unit incorporating same. 4,004,303, Cl. 5-247.000.

Mankowski, Zbigniew: *See*—
Chapiro, Adolphe; and Mankowski, Zbigniew, 4,005,059.

Mannbeck, Donald H.: *See*—
Berger, Robert L.; Hailey, William H.; Mallick, George, Jr.; Mannbeck, Donald H.; and Weight, Wilber J., 4,005,365.

Mannbro, Nils Viktor, to Skogsagarnas Industri Aktiebolag. Method, applied in the production of tall oil, of preventing or reducing the emission of odorous sulphur compounds and/or acid sulphur combustion products from the black liquor recovery process in alkaline pulping. 4,005,060, Cl. 260-97.700.

Manoly, Arthur E., to Hughes Aircraft Company. Slow-wave structure attenuation arrangement with reduced frequency sensitivity. 4,005,329, Cl. 315-3.500.

Margen, Peter Heinrich Erwin, to Aktiebolaget Atomenergi. Distillation plant. 4,004,984, Cl. 202-173.000.

Margetts, Hugh Genville; and Habgood, Gordon Alfred, to Girling Limited. Sliding caliper retaining mechanism for a disc brake. 4,004,658, Cl. 188-73.500.

Marino, Douglas E.: *See*—
Campanaro, Thomas J.; and Marino, Douglas E., 4,004,801.

Markezich, Ronald L., to General Electric Company. Method for making aromatic bis(ether dicarboxylic acid). 4,005,134, Cl. 260-520.00E.

Marquaire, Roger Andre Marie; Curtis, Michel Georges August; and Schappel, Robert Edouard, to Subsea Equipment Associates Limited. Method for connecting a submerged well head to a pipe consisting of steel tubes. 4,004,635, Cl. 166-.600.

Marquardt, Frank R.: *See*—
Mallory, Herbert D.; and Marquardt, Frank R., 4,004,515.

Marsan Manufacturing Company, Inc.: *See*—
Neumeier, Erich, 4,004,589.

Marsboom, Robert P. H. M., to Janssen Pharmaceutica N.V. Lactation stimulation employing pimozide. 4,005,211, Cl. 424-267.000.

Marsden, John Thomas, to Expert Industrial Controls Limited. Method of making core tubes for solenoids. 4,004,343, Cl. 29-596.000.

Marshall, Louis: *See*—
Solomon, Stephen M.; Shaievitz, Sidney; and Marshall, Louis, 4,004,430.

Martin, George Christopher James: *See*—
Berg, Samuel Sidney; Jenkins, David Conwil; Martin, George Christopher James; Phillipson, Ronald Frederick; and Thompson, Garth Molesdale, 4,005,217.

Martin, Manuel I.: *See*—
Meyer, Rolf; Martin, Manuel I.; and Bolton, Ronald A., 4,004,883.

Martin Marietta Corporation: *See*—
Friedell, Morley V., 4,004,611.

Martin & Pagenstecher GmbH: *See*—
Cronert, Wolfgang, 4,004,633.

Martin, Tellis Alexander; and Comer, William Timmey, to Mead Johnson & Company. Mucolytic mercaptoacylamidobenzoic and benzenesulfonic acid compounds and process. 4,005,222, Cl. 424-319.000.

Martinelli, Ramon Ubaldo; and Kressel, Henry, to RCA Corporation. Lateral current device. 4,005,451, Cl. 357-35.000.

Martins, Samuel J.: *See*—
Airheart, Franklin B.; and Martins, Samuel J., 4,004,661.

Marvin Glass & Associates: *See*—
Barlow, Gordon A., 4,004,765.
Breslow, Jeffrey D., 4,004,803.

Masaki, Hideyuki, to Kabushiki Kaisha Toyota Chuo Kenkyusho. Method for producing a sintered silicon nitride base ceramic and said ceramic. 4,004,937, Cl. 106-59.000.

Maschinenbau Greene GmbH & Co., KG: *See*—
Schulze, Wilhelm, 4,004,747.

Mashiko, Toshio: *See*—
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Mashimo, Yukio: *See*—
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Massachusetts Institute of Technology: *See*—
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Massonne, Joachim: *See*—
Fernschild, Gunter; Rudolph, Werner; and Massonne, Joachim, 4,005,176.
Rudolph, Werner; and Massonne, Joachim, 4,005,137.

Matay, Istvan M., to TRW Inc. Ultrasonic inspection method of pulse reflection defect detection using a thru-transmission automatic distance-amplitude compensation. 4,004,454, Cl. 73-67.80R.

Materials and Methods Limited: *See*—
Dunks, Clifford Matthew, 4,004,630.

Matesa, Joseph M.: *See*—
Staahl, Joseph R., Jr.; Matesa, Joseph M.; and Worth, David E., 4,004,900.

Mathues, Thomas P.: *See*—
Jacoby, Gerald B.; and Mathues, Thomas P., 4,004,423.

Matskevich, Vladimir Ivanovich: *See*—
Gavrilov, Anatoly Nikolaevich; Godin, Eduard Moiseevich; Kebets, Leonid Nikolaevich; Beregovoi, Ivan Zakharovich; Matskevich, Vladimir Ivanovich; Korf, Yakov Osherovich; and Dorofeev, Alexandr Grigorievich, 4,004,420.

Matsui, Katsuaki: *See*—
Murayama, Keisuku; Moriyama, Syoji; Yoshioka, Takao; Toda, Toshimasa; Mori, Eiko; Horiuchi, Hideo; Higashida, Susumu; Matsui, Katsuaki; Kurumada, Tomoyuki; Ohata, Noriyuki; and Ohsawa, Hisayou, 4,005,094.

Matsuki, Isamu: *See*—
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Matsumoto, Isao; and Umeda, Kenkichi, to Sony Corporation. Tape cassette and machine. 4,005,480, Cl. 360-60.000.

Matsumoto, Kazuya: *See*—
Negishi, Hirokazu; and Matsumoto, Kazuya, 4,004,851.

Matsumura, Yusuke: *See*—
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Matsushita Electric Industrial Co., Ltd.: *See*—
Fijisawa, Seiji; Meki, Norio; and Irie, Hiroyuki, 4,005,262.
Kusunoki, Shigeru; Takano, Teruhisa; Yoshimura, Hirofumi; and Kurata, Noboru, 4,005,370.

Mattiussi, Andrea; and Modena, Mario, to Montecatini Edison S.p.A. Coating compositions for metal substrates based on ethylene-tetrafluoroethylene copolymers. 4,005,157, Cl. 260-897.00C.

Mattson, Fred Hugh: *See*—
Jandacek, Ronald James; and Mattson, Fred Hugh, 4,005,196.

Matty, Robert E.; and Strom, Stephen S., to Babcock & Wilcox Company, The. Fume control for sulfur dioxide ammonia absorption systems. 4,004,966, Cl. 162-30.00R.
Maxey, Van Q., to Engelhard Minerals & Chemicals Corporation. Grinding wheel with integral blower. 4,004,378, Cl. 51-273.000.
Maxey, Van Q., to Engelhard Minerals & Chemicals Corporation. Method and apparatus for dressing regulating wheels for centerless grinders. 4,004,568, Cl. 125-11.0TP.
May & Baker Limited: *See—*
Berg, Samuel Sidney; Jenkins, David Conwil; Martin, George Christopher James; Phillipson, Ronald Frederick; and Thompson, Garth Molesdale, 4,005,217.
Mayer, Dieter: *See—*
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McAloon, Kevin Thomas: *See—*
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McAvoy, John Jerome, to Boeing Company, The. Outrigger air cushion landing system. 4,004,761, Cl. 244-100.00A.
McCabe, Francis J. Press. 4,004,480, Cl. 83-530.000.
McCollum, John D.; and Quick, Leonard M., to Standard Oil Company (Indiana). Process for recovering and upgrading hydrocarbons from tar sands. 4,005,005, Cl. 208-11.0LE.
McCormick, Thomas H., to Petrolite Corporation. Paraffin removing compositions. 4,005,020, Cl. 252-8.55B.
McCubbin, Melvin J.: *See—*
Johnson, Clifford T.; McCubbin, Melvin J.; and Zulkoski, Thomas R., 4,004,516.
McDonald, Thomas Wayne, to Esterline Electronics Corporation. CW radar system. 4,005,420, Cl. 343-7.500.
McDonnell Douglas Corporation: *See—*
Speakman, Eugene R., 4,004,484.
McGraw, Charles T.: *See—*
Higgins, Francis J.; McGraw, Charles T.; and Sanderson, Edward L., 4,004,540.
McInerny, George P., to Brandt-Pra, Inc. Endorser drum having indexable self-aligning print wheels. 4,004,506, Cl. 101-110.000.
McKee, Chester W.; and Henderson, C. Glenn, to Teleweld, Inc. Flaw detecting apparatus for railroad rails and the like. 4,004,455, Cl. 73-67.900.
McMullen, James Robert, to IMC Chemical Group, Inc. Microbiological reduction of zearalenone and related compounds. 4,004,978, Cl. 195-51.00R.
McNamara, Thomas F.: *See—*
Boriss, Robert P.; and McNamara, Thomas F., 4,004,758.
McNaney, Joseph T. Light optic data handling system. 4,004,847, Cl. 350-161.00W.
McNerney, Richard P.: *See—*
Whitfill, William A., Jr.; and McNerney, Richard P., 4,005,168.
McVeety, Harry H., to Raymond Lee Organization, Inc., The, a part interest. Vehicle oil change, filter change and tune up reminder device. 4,004,361, Cl. 40-77.600.
MDH Industries, Inc.: *See—*
Harrington, Timothy M., 4,005,364.
Mead Corporation, The: *See—*
Wood, Prentice J., 4,004,500.
Mead Johnson & Company: *See—*
Martin, Tellis Alexander; and Comer, William Timmey, 4,005,222.
Measuregraph Company, The: *See—*
Schwarz, Gail B., 4,004,748.
Mechulam, Andre; Saintours-Payerne, Bruno M.; Gay-Chatain, Guillaume A.; and Montjallard, Paul R., to Etat Francais. Military observation post. 4,004,494, Cl. 89-36.00L.
Medtronic, Inc.: *See—*
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Meier-Windhorst, Christian August; and by Meier-Windhorst, Eike, heir. Process for wet treatment of travelling webs. 4,004,879, Cl. 8-149.100.
Meier-Windhorst, Eike, heir: *See—*
Meier-Windhorst, Christian August; and Meier-Windhorst, Eike, heir, 4,004,879.
Meki, Norio: *See—*
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Melcher, Franz Josef: *See—*
Knothe, Erich; Melcher, Franz Josef; and Berg, Christoph, 4,004,458.
Melchior, Jean; and Andre, Thierry, to Franch State, The. Combustion chamber for supercharged internal combustion engine. 4,004,414, Cl. 60-39.650.
Meltzer, David W.; and Goel, Narendra S., to Xerox Corporation. Device with control grid for electrostatographic reproduction of an optical image. 4,005,438, Cl. 346-158.000.
Melzobs, Modris Jaowich: *See—*
Pormale, Milda Jaovna; Kashkina, Nadezhda Alexandrovna; Kalninsh, Arvid Janovich; Sergeeva, Varvara Nikolaevna; Surna, Janis Alexandrovich; Shusters, Janis; Melzobs, Modris Jaowich; Mikazhan, Waldis Danielowich; Purwinsh, Indulis Waldowich; Skutelis, Antons Petrowich; and Liepinsh, Martinsh Aleksandrowich, 4,005,070.
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Merck & Co., Inc.: *See—*
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Merkwitz, Gunther, to Odenwald Faserplattenwerk G.m.b.H. Supporting structure with strip grid profile bars for wall or ceiling coverings. 4,004,390, Cl. 52-484.000.
Merten, Rudolf: *See—*
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Metal Box Limited: *See—*
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Metropolitan Wire Corporation: *See—*
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Meyer, Rolf; Martin, Manuel I.; and Bolton, Ronald A., to G. D. Searle & Co. Sensing, leveling and mixing apparatus. 4,004,883, Cl. 23-259.000.
Mezhevich, Felix Evgenievich: *See—*
Andronov, Mikhail Alexandrovich; Bakun, Anatoly Nikolaevich; Mezhevich, Felix Evgenievich; Petrov, Mikhail Ivanovich; Belov, Jury Ivanovich; Feldman, Alexandr Yakovlevich, deceased; and Feldman, Raisa Alexandrovna, administratrix, 4,004,616.
Michael, Peter Colin; and Kellar, Paul Roderick Noel, to Micro Consultants Limited. Analogue-to-digital-converters. 4,005,410, Cl. 340-347.0AD.
Micro Consultants Limited: *See—*
Michael, Peter Colin; and Kellar, Paul Roderick Noel, 4,005,410.
Microwave and Electronic Systems Ltd.: *See—*
Pringle, Robert D.; and Morton, Ian F., 4,005,375.
Mietzsch, Fritz; Hardt, Dietrich; Serini, Volker; Bartl, Herbert; and Vernaleken, Hugo, to Bayer Aktiengesellschaft. Polycarbonate-polyvinyl chloride moulding compounds. 4,005,037, Cl. 260-4.0AR.
Mifflin, Ralph W., to United States of America, Air Force. Range resolving ground line sensor. 4,005,363, Cl. 324-58.50B.
Mikazhan, Waldis Danielowich: *See—*
Pormale, Milda Jaovna; Kashkina, Nadezhda Alexandrovna; Kalninsh, Arvid Janovich; Sergeeva, Varvara Nikolaevna; Surna, Janis Alexandrovich; Shusters, Janis; Melzobs, Modris Jaowich; Mikazhan, Waldis Danielowich; Purwinsh, Indulis Waldowich; Skutelis, Antons Petrowich; and Liepinsh, Martinsh Aleksandrowich, 4,005,070.
Miki, Hidejiro: *See—*
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Miller, Brian S., to United States of America, Army. Tunnel emitter photocathode. 4,005,465, Cl. 357-6.000.
Miller, Ford S.: *See—*
Nelson, Jerome W.; Miller, Ford S.; and Randolph, James B., 4,005,305.
Miller, James Joseph: *See—*
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Miller, Kenneth E.: *See—*
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Miller, Richard G.; and Cavitt, Roy L., to PPG Industries, Inc. Novel method for the rapid deposition of gold films onto non-metallic substrates at ambient temperatures. 4,005,229, Cl. 427-304.000.
Millmaster Onyx Corporation: *See—*
Green, Harold A.; Merianos, John J.; and Petrocci, Alfonso N., 4,005,193.
Millward, Thomas Hughes; Eustace, Terence Leslie; and Thompson, Barrie Arthur, to GKN Transmissions Limited. Vehicle differential units. 4,004,472, Cl. 74-713.000.
Mimco Incorporated: *See—*
Pase, Hugh H., 4,004,475.
Mindt, Wolfgang: *See—*
Racine, Philippe; Higelin, Jean-Claude; Engelhardt, Roland; and Mindt, Wolfgang, 4,005,002.
Minkoff, Walter, to Peerless Paint and Varnish Corporation. Paint composition containing denatonium benzoate or lignocaine benzyl octanoate with a latex resin binder for application over old paint films to prevent ingestion of poisons therefrom. 4,005,038, Cl. 260-17.00R.
Minnesota Mining and Manufacturing Company: *See—*
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Fischer, Earl Lee, 4,004,566.
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Minolta Camera Kabushiki Kaisha: *See—*
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Miron, Jerry; Savla, Manilal; and Skeist, Irving, to Skeist Laboratories, Incorporated. Anaerobic aminimide curing compositions. 4,005,055, Cl. 260-47.0UA.

Mironova, Ljubov Leonidovna: *See*—
Chumakov, Mikhail Petrovich; Prokhorova, Inna Alexandrovna; Grachev, Viktor Pavlovich; Petukhova, Valentina Vasilievna; Svezhinina, Julia Anatolievna; Mironova, Ljubov Leonidovna; Ralf, Ninel Mikhailovna; Popova, Valentina Dmitrievna; Mustafina, Aida Nurislamovna; and Chernyshev, Vladimir Ivanovich, 4,004,974.

Misawa, Tatsuo: *See*—
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Mishin, Konstantin Yakovlevich: *See*—
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Mitchell, James P.; and Lakoma, Henry J. Component container. 4,005,295, Cl. 200-61.620.

Mitchell, William O.; and Moore, Billy R., to Oxford Industries, Inc. Fabric cutting apparatus. 4,004,477, Cl. 83-23.000.

Mitsubishi Denki Kabushiki Kaisha: *See*—
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Otsubo, Mutsuyuki; Miki, Hidejiro; and Shirahata, Kiyoshi, 4,004,953.
Shibayama, Kyoichi; Sato, Fumihiko; and Takahama, Takashi, 4,004,999.

Mitsubishi Jukogyo Kabushiki Kaisha: *See*—
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Mitsubishi Paper Mills, Ltd.: *See*—
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Miura, Nobuaki: *See*—
Tanimura, Shigeru; Miura, Nobuaki; and Miyamoto, Mikizo, 4,005,468.

Miyadera, Tetsuo; Breuer, Hermann; and Treuner, Uwe D., to E. R. Squibb & Sons, Inc. 3-Heterothiomethyl-7α-methoxy-7β-tetrazolylmethylthioacetamido-3-cephem derivatives. 4,005,091, Cl. 260-243.00C.

Miyamoto, Masao: *See*—
Aya, Masahiro; Miyamoto, Masao; Fukazawa, Nobuo; and Yamagishi, Masaaki, 4,005,071.

Miyamoto, Mikizo: *See*—
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Miyazawa, Sadayuki; and Takaya, Yoshikazu, to Mitsubishi Paper Mills, Ltd. Color photographic material. 4,004,928, Cl. 96-84.0UV.

Mizukawa, Shigeo, to Fuji Photo Optical Co., Ltd. Photographic camera with cover for exposure conditions selector means. 4,005,460, Cl. 354-202.000.

Mizuno, William G.; and Henderson, Iris N., to Economics Laboratory, Inc. Treatment of fabrics in machine dryers. 4,004,685, Cl. 206-.500.

Mobil Oil Corporation: *See*—
Allen, Linus S., 4,005,290.
Burdyn, Ralph F.; Chang, Harry L.; and Cook, Evin L., 4,004,638.

Modena, Mario: *See*—
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Mogard, Johan Hilding, to Aktiebolaget Atomenergi. Nuclear fuel element. 4,004,972, Cl. 176-81.000.

Mohr, Terry W.: *See*—
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Molinari, Alicide: *See*—
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Moll, Hans: *See*—
Haese, Egon; and Moll, Hans, 4,005,016.

Mollard, Paul; and Lakodey, Pierre, to Produits Chimiques Ugine Kuhlmann. Method of preparing sodium chlorate by electrolysis. 4,004,988, Cl. 204-95.000.

Moller, Eike; Meng, Karl; Wehinger, Egbert; and Horstmann, Harald, to Bayer Aktiengesellschaft. Pyrazol-5-ones. 4,005,215, Cl. 474-273.000.

Molycorp, Inc.: *See*—
Wilson, William G., 4,004,919.

Monajjem, Freydoun: *See*—
Jones, Billy Joe; Linnstaedter, Donald James; and Monajjem, Freydoun, 4,004,958.

Monitor Labs, Incorporated: *See*—
Byrne, James Donald; and Griffith, Paul Arthur, 4,004,882.

Monnier, Joel: *See*—
Baruch, Pierre; Borel, Joseph; and Monnier, Joel, 4,004,950.

Monsanto Company: *See*—
Knowles, William S.; Sabacky, Milton J.; and Vineyard, Billy D., 4,005,127.
O'Neill, Francis J., 4,005,241.
Schepp, Edwin F.; and Coffey, Ronald B., 4,004,376.

Montagna, Angelo A., to Gulf Research & Development Company. Combination residue hydrodesulfurization and thermal cracking process. 4,005,006, Cl. 208-89.000.

Montecatini Edison S.p.A.: *See*—
Mattiussi, Andrea; and Modena, Mario, 4,005,157.

Montjallard, Paul R.: *See*—
Mechulam, Andre; Saintours-Payerne, Bruno M.; Gay-Chatain, Guillaume A.; and Montjallard, Paul R., 4,004,494.

Moore, Billy R.: *See*—
Mitchell, William O.; and Moore, Billy R., 4,004,477.

Moore, George G. I.; and Harrington, Joseph Kenneth, to Minnesota Mining and Manufacturing Company. Perfluoroalkylsulfonamidoaryl compounds. 4,005,141, Cl. 260-556.00F.

Moore, John J. Twin turbine-wheel driven boat. 4,004,544, Cl. 115-50.000.

Moore, Stanley H., to Wescan Mining Trucks & Equipment Ltd. Torque transmitting assembly. 4,004,474, Cl. 74-801.000.

Morgan, Gaylard M., to F. L. Smithe Machine Company, Inc. Apparatus for adjusting the position of a rotatable cutter mechanism. 4,004,478, Cl. 83-331.000.

Morgan, Samuel A., to Sycor, Inc. Method and means for moving recording heads in disc-type recorders. 4,005,493, Cl. 360-106.000.

Mori, Chiharu; and Kawasaki, Masahiro, to Asahi Kogaku Kogyo Kabushiki Kaisha. Exposure meter circuit. 4,004,853, Cl. 356-226.000.

Mori, Eiko: *See*—
Murayama, Keisuku; Moriyama, Syoji; Yoshioka, Takao; Toda, Toshimasa; Mori, Eiko; Horiuchi, Hideo; Higashida, Susumu; Matsui, Katsuaki; Kurumada, Tomoyuki; Ohata, Noriyuki; and Ohsawa, Hisayou, 4,005,094.

Morinaga, Tsuyoshi; Nakazawa, Yuji; Arimoto, Kyozo; Takahashi, Katuhiko; and Arai, Yoshiyuki, to Daicel, Ltd. 13-Oxabicyclo(10,4,0)hexadec-1(12)-en-14-one. 4,005,107, Cl. 260-343.20R.

Moriyama, Syoji: *See*—
Murayama, Keisuku; Moriyama, Syoji; Yoshioka, Takao; Toda, Toshimasa; Mori, Eiko; Horiuchi, Hideo; Higashida, Susumu; Matsui, Katsuaki; Kurumada, Tomoyuki; Ohata, Noriyuki; and Ohsawa, Hisayou, 4,005,094.

Morley, Richard E.; and Schwenk, George G., to Termiflex Corporation. Hand-held interactive terminal. 4,005,388, Cl. 340-172.500.

Morozowich, Walter, to Upjohn Company, The. $PGF_{2\alpha}$, L-Arginine salt. 4,005,133, Cl. 260-501.110.

Morrin, Thomas Harvey, II, to International Business Machines Corporation. Compression of gray scale imagery to less than one bit per picture element. 4,005,411, Cl. 340-347.0DD.

Morris, Robert B., to Westinghouse Air Brake Company. Multi-brake shoe means for a multi-braking surface braked assembly. 4,004,656, Cl. 188-52.000.

Morris, Ronald G., to Beaver-Advance Corporation. Adjustable heighth shoring. 4,004,393, Cl. 52-637.000.

Morse, Glenn B.: *See*—
Bohn, August C.; and Morse, Glenn B., 4,004,328.

Morton, Ian F.: *See*—
Pringle, Robert D.; and Morton, Ian F., 4,005,375.

Moses, Daniel H., to Champion International Corporation. Handling and dispensing system and apparatus for cylindrical objects. 4,004,701, Cl. 214-16.40A.

Moskovich, Peter P., Jr.: *See*—
Weidenaar, Bernard E.; Voelz, Frederick L.; Simnick, James J.; and Moskovich, Peter P., Jr., 4,004,621.

Moss, Lester I., to Mosstype Corporation. Mounting-proofing machine. 4,004,509, Cl. 101-216.000.

Mosstype Corporation: *See*—
Moss, Lester I., 4,004,509.

Motor Wheel Corporation: *See*—
Main, John A., 4,004,837.

Motorola, Inc.: *See*—
Dano, Arnold Vincent, 4,005,367.
Davis, William Folsom, 4,005,342.
Lesk, Israel Arnold, 4,004,949.

Mott, George E., to Texaco Inc. Drilling system for deep water offshore locations. 4,004,531, Cl. 114-256.000.

Mott, Roger Eugene, to Deere & Company. Drive line safety shield. 4,004,436, Cl. 64-32.00R.

Motz, Herbert: *See*—
Kopke, Helmut; Hartmann, Hans-Joerg; Mayer, Dieter; and Motz, Herbert, 4,005,242.

Mould, Geoffrey James Julien: *See*—
Veltman, Herbert; Mould, Geoffrey James Julien; and Kawulka, Paul, 4,004,991.

Mouton, William J., Jr. Deep underwater sphere. 4,004,429, Cl. 61-86.000.

Moyer Diebel Limited: *See*—
Pond, John Francis, 4,004,712.

Mrozik, Helmut H., to Merck & Co., Inc. Substituted benzenesulfonamides as anthelmintics. 4,005,199, Cl. 424-228.000.

Mueller, Herbert: *See*—
Fischer, Roman; Goetz, Norbert; and Mueller, Herbert, 4,005,147.

Mumford, Eustace Harold, to Owens-Illinois, Inc. Safety lock for forming machine blowhead. 4,004,905, Cl. 65-159.000.

Mundy, Joseph L.: *See*—
Joynson, Reuben E.; Mundy, Joseph L.; and Banerji, Ranan, 4,005,385.

Munz, Ferdinand: *See*—
Hack, Helmuth; Munz, Ferdinand; Eue, Ludwig; and Schafer, Werner, 4,004,913.

Murayama, Keisuku; Moriyama, Syoji; Yoshioka, Takao; Toda, Toshimasa; Mori, Eiko; Horiuchi, Hideo; Higashida, Susumu; Matsui, Katsuaki; Kurumada, Tomoyuki; Ohata, Noriyuki; and Ohsawa, Hisayou, to Sankyo Company Limited. Piperidine-spiro-hydantoin derivatives. 4,005,094, Cl. 260-293.660.

Muriot, Edward E., to Health Technology Laboratories, Inc. Medical/surgical suction equipment. 4,004,590, Cl. 128-276.000.

Muro, Tomio; Chihara, Yasuaki; Fukuzawa, Sogo; Ogawa, Kiyoshi;

and Nakanishi, Akira, to Yoshitomi Pharmaceutical Industries, Ltd. Thienylmethyl phenoxy morpholine compounds. 4,005,084, Cl. 260-247.10P.

Murray Corporation: *See—*
Kish, Arthur S., 4,004,608.

Musall, Reimar; and Wolsing, Wilhelm, to Kali-Chemie Aktiengesellschaft. Exhaust gas cleaning arrangement with a resiliently supported monolithic ceramic catalyzer. 4,004,888, Cl. 23-288.0FC.

Musgrave, Donald James: *See—*
Nunzio, Napoleone; and Musgrave, Donald James, 4,005,280.

Musser, Jerry Lee: *See—*
Koch, Frederick William; and Musser, Jerry Lee, 4,005,159.

Mustafina, Aida Nurislamovna: *See—*
Chumakov, Mikhail Petrovich; Prokhorova, Inna Alexandrovna; Grachev, Viktor Pavlovich; Petukhova, Valentina Vasilievna; Svezhinina, Julia Anatolievna; Mironova, Ljubov Leonidovna; Ralf, Ninel Mikhailovna; Popova, Valentina Dmitrievna; Mustafina, Aida Nurislamovna; and Chernyshev, Vladimir Ivanovich, 4,004,974.

Naber, Jaap E.: *See—*
Groenendaal, Willem; Taubert, Friedrich C.; Naber, Jaap E.; and Bekker, Gijsbertus A., 4,004,885.

Nagaoka, Tadahiko: *See—*
Kosaka, Katuaki; Ueno, Zene; and Nagaoka, Tadahiko, 4,004,554.
Ueno, Zene; and Nagaoka, Tadahiko, 4,004,413.

Nagy, Louis L., to General Motors Corporation. Dual quadrature polarization radar system. 4,005,425, Cl. 343-17.700.

Nakabayashi, Masahiro: *See—*
Zvanut, Albert J.; and Nakabayashi, Masahiro, 4,005,309.

Nakagawa, Hirohide: *See—*
Washizuka, Isamu; and Nakagawa, Hirohide, 4,005,403.

Nakagome, Takenari: *See—*
Yamada, Hirotada; Tobiki, Hisao; Nakatsuka, Iwao; Tanno, Norihiko; Shimago, Kozo; and Nakagome, Takenari, 4,005,075.

Nakajima, Hiroshi: *See—*
Ando, Kiyoatsu; Nakajima, Hiroshi; and Ueno, Hiroshi, 4,004,760.

Nakamura, Akira: *See—*
Seko, Maomi; Ogawa, Shinsaku; Yoshida, Mitsuo; and Nakamura, Akira, 4,005,004.

Nakamura, Hiromichi: *See—*
Inoue, Naohiko; Yanagishima, Takayuki; Nakamura, Hiromichi; and Fukasawa, Noburu, 4,005,398.

Nakamura, Norihiko; and Nakayama, Fujio, to Toyota Jidosha Kogyo Kabushiki Kaisha. Spark ignition engine using lean air-fuel mixture. 4,004,563, Cl. 123-191.00S.

Nakamura, Robert M.; and Davajan, Val. Intracervical contraceptive device. 4,004,582, Cl. 128-130.000.

Nakamura, Zenzo: *See—*
Uchiyama, Takashi; Mashimo, Yukio; Taguchi, Tetsuya; and Nakamura, Zenzo, 4,005,444.

Nakanishi, Akira: *See—*
Muro, Tomio; Chihara, Yasuaki; Fukuzawa, Sogo; Ogawa, Kiyoshi; and Nakanishi, Akira, 4,005,084.

Nakatsuka, Iwao: *See—*
Yamada, Hirotada; Tobiki, Hisao; Nakatsuka, Iwao; Tanno, Norihiko; Shimago, Kozo; and Nakagome, Takenari, 4,005,075.

Nakayama, Fujio: *See—*
Nakamura, Norihiko; and Nakayama, Fujio, 4,004,563.

Nakayama, Yasuhiro: *See—*
Yamamoto, Nobuo; Hori, Kiyotaka; Yoneyama, Masakazu; Nakayama, Yasuhiro; and Abe, Akira, 4,004,927.

Nakazawa, Tamotu: *See—*
Seki, Mitsuaki; and Nakazawa, Tamotu, 4,005,386.

Nakazawa, Yuji: *See—*
Morinaga, Tsuyoshi; Nakazawa, Yuji; Arimoto, Kyozo; Takahashi, Katuhiko; and Arai, Yoshiyuki, 4,005,107.

Nathan, Richard A.; Schwerzel, Robert E.; Adelman, Albert H.; and Wyant, Robert E., to Battelle Development Corporation. Solar energy collection and retrieval employing reversible photochemical isomerization. 4,004,572, Cl. 126-270.000.

Nathan, Richard A.: *See—*
Frieling, Donald H.; Talbert, Sherwood G.; and Nathan, Richard A., 4,004,573.
Schwerzel, Robert E.; and Nathan, Richard A., 4,004,571.

National Can Corporation: *See—*
Kraska, John L., 4,005,000.

National Semiconductor Corporation: *See—*
Dobkin, Robert C., 4,004,462.
Harris, James M.; and Gouin, William M., 4,005,472.

Naydan, Theodore T.: *See—*
Aker, Walter W.; and Naydan, Theodore T., 4,004,737.

Needham, Riley B.; Glinsmann, Gilbert R.; and Wier, Donald R., to Phillips Petroleum Company. Oil recovery by improved surfactant flooding. 4,004,637, Cl. 166-273.000.

Negishi, Hirokazu; and Matsumoto, Kazuya. Optical device with means for reducing internal reflections. 4,004,851, Cl. 350-311.000.

Nekula, Ronald M., to Xerox Corporation. Cleaning method for automatic document handler. 4,004,941, Cl. 134-15.000.

Nelson, Arlan L. Mirror apparatus. 4,004,850, Cl. 350-299.000.

Nelson, Arthur L., to Hexcel Corporation. High voltage cable splice apparatus. 4,004,867, Cl. 425-11.000.

Nelson, Jerome W.; Miller, Ford S.; and Randolph, James B., to CRC-Crose International, Inc. Shielding apparatus. 4,005,305, Cl. 219-72.000.

Nemecek, Oldrich: *See—*
Semonsky, Miroslav; Cerny, Antonin; Nemecek, Oldrich; Rezabek, Karel; Seda, Miroslav; Trcka, Vaclav; and Grimova, Jaroslava, 4,005,090.

Nerstad, Karl A.; Koch, Franklin O., Jr.; and Chadwick, Curtis E., III, to Caterpillar Tractor Co. Self-modulated clutch with drag-reduction valve. 4,004,670, Cl. 192-105.00A.

Neumann, John W., to Oxy Metal Industries Corporation. Method for fluid conveyance of articles. 4,004,349, Cl. 34-10.000.

Neumann, Lutz: *See—*
Bohm, Walter; Kritzler, Helmuth; and Neumann, Lutz, 4,005,143.

Neumeier, Erich, to Marsan Manufacturing Company, Inc. Ostomy irrigation apparatus. 4,004,589, Cl. 128-245.000.

Newman, James L. Mechanical drilling jar. 4,004,643, Cl. 175-321.000.

Nicho, Kenji: *See—*
Fukuoka, Hiroshi; Kameyama, Teruhiko; Takahashi, Yuji; Nicho, Kenji; Misawa, Tatsuo; Inoue, Tsuneyuki; and Imai, Kimiaki, 4,004,918.

Nichol, Charles A.: *See—*
Stickney, Dwight R.; Simmons, William S.; Nichol, Charles A.; Hitchings, George H.; and Elion, Gertrude B., 4,005,203.
Stickney, Dwight R.; Simmons, William S.; Nichol, Charles A.; Hitchings, George H.; and Elion, Gertrude B., 4,005,204.

Nichols, Richard W., to Hughes Aircraft Company. Apparatus for increasing output efficiency of an optically pumped Nd:YAG laser. 4,005,333, Cl. 315-173.000.

Nicholson, John Robert Frederick: *See—*
Grosvenor, Derek; and Nicholson, John Robert Frederick, 4,004,935.

Nickson Industries, Inc.: *See—*
Evans, Ralph K.; and Florian, Roy S., 4,004,768.

Nicolas, Alexandros: *See—*
Kaeding, Heinz; and Nicolas, Alexandros, 4,004,593.

Nihon Jescoal Industry Co., Ltd.: *See—*
Kato, Hisayoshi; and Ueno, Ryuhji, 4,004,369.

Niimi, Masayoshi; and Ishida, Kinya, to Nippondenso Co., Ltd. Control system for DC motors. 4,005,348, Cl. 318-373.000.

Nijs, Marc, to N.V. Bekaert S.A. Method for packing coils of wire netting. 4,004,396, Cl. 53-14.000.

Nikkiso Eiko Co., Ltd.: *See—*
Ikeda, Yoshi; Osada, Kenji; and Doi, Kazumi, 4,004,865.

Nikolaus Sorg G.m.b.H. & Co.: *See—*
Pieper, Helmut, 4,004,902.

Nilsson, Jan; and Swanson, Rune, to Saab-Scania Aktiebolag. Piezoelectric generator operated by fluid flow. 4,005,319, Cl. 310-8.300.

Nilsson, Sven Walter, to SKF Nova A.B. Steering mechanism. 4,004,537, Cl. 114-144.00R.

Nippon Electric Company, Ltd.: *See—*
Araseki, Takashi; Ochiai, Kazuo; Ogihara, Takashi; and Tanaka, Shunji, 4,005,277.
Kaneko, Haruo; Katagiri, Yoshio; and Yano, Kaoru, 4,005,406.

Nippon Gakki Seizo Kabushiki Kaisha: *See—*
Yokoyama, Kenji, 4,005,353.

Nippon Kayaku Kabushiki Kaisha: *See—*
Aoki, Yukio; Wakita, Shizuo; Kato, Shoichi; and Ishida, Shuichi, 4,005,148.

Nippon Kogaku K.K.: *See—*
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Nippon Peroxide Co., Ltd.: *See—*
Ito, Yoshio; and Mashiko, Toshio, 4,005,182.

Nippondenso Co., Ltd.: *See—*
Kato, Masumi; Kanazawa, Shigenori; and Oshikawa, Kiyomitsu, 4,004,829.
Niimi, Masayoshi; and Ishida, Kinya, 4,005,348.

Nishida, Mitso: *See—*
Tsukamoto, Kenkichi; Matsumura, Yusuke; and Sano, Ryuichi, 4,004,997.

Nishimatsu, Shigeru: *See—*
Yoshida, Isao; Tokuyama, Takeshi; Nishimatsu, Shigeru; and Ikeda, Takahide, 4,005,450.

Nishimura, Seiichiro: *See—*
Takasuga, Yutaka; Nishimura, Seiichiro; and Suzuki, Masayoshi, 4,004,961.

Nissan Motor Co., Ltd.: *See—*
Inoue, Naohiko; Yanagishima, Takayuki; Nakamura, Hiromichi; and Fukasawa, Noburu, 4,005,398.
Kosaka, Katuaki; Ueno, Zene; and Nagaoka, Tadahiko, 4,004,554.
Ohdate, Keiki, 4,004,868.
Shimada, Yukio, 4,004,649.
Sogabe, Yoji; Edamatsu, Tetsuo; and Oka, Takashi, 4,004,828.
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Nissei Plastics Industrial Co., Ltd.: *See—*
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Nissin Steel Co. Ltd.: *See—*
Fukuoka, Hiroshi; Kameyama, Teruhiko; Takahashi, Yuji; Nicho, Kenji; Misawa, Tatsuo; Inoue, Tsuneyuki; and Imai, Kimiaki, 4,004,918.

Nitto Chemical Industry Co., Ltd.: *See—*
Tazawa, Shunsuke; and Okabe, Kazuo, 4,004,428.

Noda, Hiroshi; and Watanabe, Yukiyasu, to Mitsubishi Denki Kabushiki Kaisha. Radar with sampling gate circuit for video signal. 4,005,422, Cl. 343-17.10R.

Nohe, Heinz; and Nottes, Ernst Guenther, to BASF Aktiengesellschaft. Otto cycle engine fuels containing derivatives of cyclic polycarboxylic acids. 4,004,894, Cl. 44-58.000.

Nola, Sebastian. Hydraulic loading and unloading dock. 4,004,311, Cl. 14-71.700.

Nomura, Tatsuo: *See—*
Kato, Koso; and Nomura, Tatsuo, 4,004,977.

Norberg, Lars-Gunnar: *See—*
Folgero, Kare; and Norberg, Lars-Gunnar, 4,004,792.
Norris, Robert. Milk fat containing products and processes therefor. 4,005,228, Cl. 426-586.000.
Northern Telecom Limited: *See—*
Dalgleish, Jack Frank; and Lukas, Helmut Hans, 4,004,446.
Kugler, Jindrich; Dvorak, Alfred; and Elliott, Charles John, 4,005,352.
Norton, Henry James: *See—*
Gotchel, Joel Peter; Norton, Henry James; Spengos, Aris Constantine; and Vaalburg, Lawrence, 4,004,323.
Nottes, Ernst Guenther: *See—*
Nohe, Heinz; and Nottes, Ernst Guenther, 4,004,894.
Novikov, Oleg Nikolaevich: *See—*
Yakshin, Alexandr Sergeevich; Novikov, Oleg Nikolaevich; Grechinsky, Dmitry Alexeevich; Klochko, Viktor Alexandrovich; and Rygalin, Viktor Georgievich, 4,004,450.
Nowaczyk, Philip J.: *See—*
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Nowak, Teodor: *See—*
Krol, Leszek; Gierek, Adam; Skoczkowski, Kazimierz; Bednarczyk, Stanislaw; Mandelka, Pawel; Nowak, Teodor; and Krzemien, Eugeniusz, 4,004,790.
Nunzio, Napoleone; and Musgrave, Donald James, to Dennison Manufacturing Company. Ticket reader. 4,005,280, Cl. 235-61.11R.
Nusslein, Ludwig; Pieroh, Ernst Albrecht; and Roder, Kurt, to Schering Aktiengesellschaft. 2,5-Substituted-1,3,4-thiadiazoles as fungicides. 4,005,213, Cl. 424-270.000.
N.V. Bekaert S.A.: *See—*
Hoorelbeke, Luc, 4,004,744.
Nijs, Marc, 4,004,396.
O'Brien, John T.; and White, Woodrow W., to Uniroyal Inc. Bisulfite terminated oligomers as dispersing agents. 4,004,939, Cl. 106-135.000.
Obrycki, Raymond F.: *See—*
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Occidental Petroleum Corporation: *See—*
Logan, Forrest E., 4,004,336.
Ochiai, Kazuo: *See—*
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O'Connell, Donald L., to Floral Innovations, Inc. Decorative holder for flower arrangements. 4,004,367, Cl. 47-41.120.
O'Day, Richard Lewis: *See—*
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Odenwald Faserplattenwerk G.m.b.H.: *See—*
Merkwitz, Gunther, 4,004,390.
Oder, Robin R., to J. M. Huber Corporation. Apparatus for magnetic beneficiation of particle dispersion. 4,005,008, Cl. 209-223.00R.
O'Donnell, John Francis, to G.L.P. Company. Boundary marker. 4,004,545, Cl. 116-63.00P.
Oertel, Lothar: *See—*
Dickopp, Gerhard; Oertel, Lothar; and Frey, Wolfgang, 4,005,476.
Oesterlin, Donald L.; and Obrycki, Raymond F., to G. D. Searle & Co. Mass counting of radioactivity samples. 4,005,292, Cl. 250-364.000.
Ogawa, Kiyoshi: *See—*
Muro, Tomio; Chihara, Yasuaki; Fukuzawa, Sogo; Ogawa, Kiyoshi; and Nakanishi, Akira, 4,005,084.
Ogawa, Shinsaku: *See—*
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Ogawa, Yo: *See—*
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Ogihara, Takashi: *See—*
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Oguchi, Kikuo: *See—*
Shibata, Shin; and Oguchi, Kikuo, 4,005,321.
O'Hara, Mark J., to UOP Inc. Hydrocarbonaceous black oil conversion process. 4,005,007, Cl. 208-111.000.
Ohata, Noriyuki: *See—*
Murayama, Keisuku; Moriyama, Syoji; Yoshioka, Takao; Toda, Toshimasa; Mori, Eiko; Horiuchi, Hideo; Higashida, Susumu; Matsui, Katsuaki; Kurumada, Tomoyuki; Ohata, Noriyuki; and Ohsawa, Hisayou, 4,005,094.
Ohdate, Keiki, to Nissan Motor Co., Ltd. Injection mold for laminated article. 4,004,868, Cl. 425-130.000.
Ohlsson, Ingemar Wilhelm: *See—*
Rausing, Ruben Anders; and Ohlsson, Ingemar Wilhelm, 4,004,727.
Ohrberg, Carl Verner, to Danfoss A/S. Gerotor device with valve compensating means. 4,004,866, Cl. 418-61.00B.
Ohsawa, Hisayou: *See—*
Murayama, Keisuku; Moriyama, Syoji; Yoshioka, Takao; Toda, Toshimasa; Mori, Eiko; Horiuchi, Hideo; Higashida, Susumu; Matsui, Katsuaki; Kurumada, Tomoyuki; Ohata, Noriyuki; and Ohsawa, Hisayou, 4,005,094.
Oiern, Per Jorgen; and Osmundsvaag, Knut Helge, to A/S Akers Mek. Verksted. Vessel comprising a hull for transporting cooled liquefield gas. 4,004,535, Cl. 114-74.00A.
Oka, Takashi: *See—*
Sogabe, Yoji; Edamatsu, Tetsuo; and Oka, Takashi, 4,004,828.
Okabe, Kazuo: *See—*
Tazawa, Shunsuke; and Okabe, Kazuo, 4,004,428.
Okuno, Youichi, to Canon Kabushiki Kaisha. Light measuring device for a single lens reflex camera with a pentagonal prism. 4,005,458, Cl. 354-155.000.
Old Fort International Inc.: *See—*
Balborn, Milo G., 4,004,869.
Oleson, Duane E.: *See—*
Pinch, Louise C., 4,004,294.
Olin Corporation: *See—*
Popplewell, James M.; Pryor, Michael J.; and Beck, Alexander F., 4,005,003.
Ralston, Richard W., Jr., 4,004,989.
Saeman, Walter C., 4,005,087.
Olivier, Lynn, to Lawrence Peska Associates, Inc., a part interest. Handle device. 4,004,722, Cl. 224-45.00P.
Olson, Robert K., to Medtronic, Inc. Disc switch. 4,005,296, Cl. 200-85.00R.
Olson, Steven L.: *See—*
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Olympus Optical Co., Ltd.: *See—*
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Omark Industries, Inc.: *See—*
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Omron Tateisi Electronics Co.: *See—*
Tanimura, Shigeru; Miura, Nobuaki; and Miyamoto, Mikizo, 4,005,468.
Onal, Hasan F., to Hydro-Tech Corporation. Jet boat pump. 4,004,541, Cl. 115-12.00R.
O'Neill, Francis J., to Monsanto Company. Metal plated polymeric article. 4,005,241, Cl. 428-335.000.
Onodera, Nobuo: *See—*
Wataya, Masataka; Onodera, Nobuo; and Imamura, Shosuke, 4,005,151.
Opocensky, Willard J., to Xerox Corporation. Apparatus and method for loading and unloading transducer heads. 4,005,485, Cl. 360-75.000.
Orita, Isamu: *See—*
Fujiwara, Hideo; Ichinose, Yukio; Ichino, Kazuo; Orita, Isamu; Uesaka, Yasutaro; Itoh, Michiyasu; and Thuruoka, Hisashi, 4,005,396.
Orvis, Roy L., to Eastman Kodak Company. Color corrected photographic elements. 4,004,929, Cl. 96-100.000.
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Ott, Albert. Probe with ball bearing ball. 4,005,360, Cl. 324-34.0TK.
Ottesen, Hjalmar Holmboe, to International Business Machines Corporation. Phase equalized readback apparatus and methods. 4,005,477, Cl. 360-51.000.
Overby, Clarence Winfred, to Combustion Engineering, Inc. Flux breaker for submerged arc strip cladding of metallic work pieces. 4,005,306, Cl. 219-76.000.
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Oztekin, Muammer A. Detachable end platform for merchandise display unit. 4,004,769, Cl. 248-188.100.
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Panduit Corporation: *See—*
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Park, Yoon Soo; and Yu, Phil Won, to United States of America, Air Force. Fabrication of ion implanted P-N junction devices. 4,004,342, Cl. 29-590.000.

Parker Drilling Company, Inc.: *See—*
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Parkinson, Gerald W., to United States of America, Navy. Electrostatic field sensor. 4,005,357, Cl. 324-32.000.

Parks, John D., to United States of America, Army. Cathode ray tube digitizer. 4,005,407, Cl. 340-347.0AD.

Parlette, Joseph N., to L.S. Love & Associates Limited. Gravitational separator. 4,005,019, Cl. 210-525.000.

Pase, Hugh H., to Mimco Incorporated. Portable wrench for rotary members. 4,004,475, Cl. 81-57.140.

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Pearce, Shairyl I.; Ireland, Gerald B.; and Windish, Willis E., to Caterpillar Tractor Co. Broad range fluid and mechanical power transmission for vehicles or the like. 4,004,473, Cl. 74-759.000.

Pearce, Stephen Lionel: *See—*
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Pellatiro, Leonard P.: *See—*
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Pemsler, J. Paul; and Litchfield, John K., to Kennecott Copper Corporation. Steam stripping of ammoniacal solutions and simultaneous loading of metal values by organic acids. 4,005,173, Cl. 423-24.000.

Penn, Mitchell E.: *See—*
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Penzel, Hans-Joerg, to Siemens Aktiengesellschaft. Arrangement for reducing the access time in a storage system. 4,005,389, Cl. 340-172.500.

Pereda, Fernando Ramon. Arrangement for the management of pastures along land strips limited by wire fences. 4,004,781, Cl. 256-10.000.

Perper, Lloyd J., to Iota Engineering Inc. High frequency power source for fluorescent lamps and the like. 4,005,335, Cl. 315-224.000.

Perry, Eldon E. Grinding mechanism. 4,004,741, Cl. 241-55.000.

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Peterson, Harold E.; and Rathke, Philip P., to Owens-Illinois, Inc. Polymerization of vinyl chloride. 4,005,249, Cl. 526-60.000.

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Pfeiffer, Rolf Alfons. Rotary internal combustion engine of axially sliding vane type. 4,004,556, Cl. 123-8.450.

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Pickering, John Flory, to Girling Limited. Tandem master cylinders for hydraulic braking systems. 4,004,425, Cl. 60-562.000.

Pickles, Joseph, to Ferro Manufacturing Corporation. Manual seat adjuster. 4,004,772, Cl. 248-430.000.

Pieper, Helmut, to Nikolaus Sorg G.m.b.H. & Co. Method of dyeing and treating glass streams. 4,004,902, Cl. 65-134.000.

Pierce, William C.; Berry, Samuel M.; and Johnson, Arthur D., to Pitts Industries, Inc. (Entire). Method of making clutch pulley. 4,004,335, Cl. 29-159.00R.

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Piggott, Kenneth Elliot, to Prolux Paint Manufacturers (PTY) Limited. Air-drying or heat-curable polyurethane coating compositions. 4,005,041, Cl. 260-18.0TN.

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Pingitore, Peter J.: *See—*
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Plant, Anthony Brian, to Lucas Industries Limited. Electromagnetic position transducers. 4,005,354, Cl. 323-51.000.

Plantard, Maurice, to Shell Oil Company. Plastic filling nozzle for use at filling stations. 4,005,339, Cl. 217-2.00J.

Plattner, Eric; and Comninellis, Christos, to Ciba-Geigy Corporation. Process for the manufacture of sulphonic acid fluorides. 4,005,138, Cl. 260-543.00F.

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Pneumatiques, Caoutchouc Manufacture et Plastiques Kleber-Colombes: *See—*
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Podpaly, Alex. Tappet follower retrieval tool. 4,004,834, Cl. 294-19.00R.

Poirier, Joseph L.; and Tropea, David H., to United States of America, Air Force. System to simulate motion and plasma induced signal variations from reentry vehicles. 4,005,366, Cl. 325-67.000.

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Pond, John Francis, to Moyer Diebel Limited. Vending machine and microwave oven combination. 4,004,712, Cl. 221-150.00A.
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Pormale, Milda Jaovna; Kashkina, Nadezhda Alexandrovna; Kalninsh, Arvid Janovich; Sergeeva, Varvara Nikolaevna; Surna, Janis Alexandrovich; Shusters, Janis; Melzobs, Modris Jaowich; Mikazhan, Waldis Danielowich; Purwinsh, Indulis Waldowich; Skutelis, Antons Petrowich; and Liepinsh, Martinsh Aleksandrowich. Polymer derivative of -diethylaminoethyl ester of p-aminobenzoic acid with celluloseglycolic acid, method of producing and application thereof. 4,005,070, Cl. 536-66.000.
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Prochazka, Svante, to General Electric Company. Sintered dense silicon carbide. 4,004,934, Cl. 106-44.000.
Prochazka, Svante, to General Electric Company. Dense sintered boron carbide containing beryllium carbide. 4,005,235, Cl. 428-36.000.
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Radielovic, Dragutin; and Verheij, Cornelis Machiel, to U.S. Philips Corporation. Mercury vapor discharge lamp for use in color copying by means of electrophotographic processes. 4,005,328, Cl. 313-487.000.
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Ravich, Leonard E., to Gorham International Inc. Disposable towel. 4,004,711, Cl. 221-63.000.
Rawicz, Harris C.; Bigley, William J.; Cangiani, Gene L.; and Yohannan, Rene C., to Lockheed Electronics Co., Inc. Automated fire control apparatus. 4,004,729, Cl. 235-61.50S.
Raymond Lee Organization, Inc., The: *See—*
Blair, C. Lee, 4,004,814.
Green, Alice, 4,004,825.
McVeety, Harry H., 4,004,361.
Tibbits, Richard Paul, 4,005,313.
Raytheon Company: *See—*
Collins, John D., 4,005,417.
RB Toy Development Co.: *See—*
Kupperman, Sam; and Kupperman, Dennis I., 4,004,597.
RCA Corporation: *See—*
Dawson, Robert Herman, 4,005,466.
Ho, Pang-Ting; and Rosen, Arye, 4,005,372.
Keizer, Eugene Orville, 4,005,474.
Kleinknecht, Hans Peter; and Kiess, Helmut Gustav, 4,005,436.
Martinelli, Ramon Ubaldo; and Kressel, Henry, 4,005,451.
Ross, Daniel Louis; and Barton, Lucian Anthony, 4,005,437.
Tshudy, Donald Richard; and Edwards, Thomas William, 4,004,954.
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Recognition Equipment Incorporated: *See—*
Cook, Paul A., 4,005,287.
Faulkner, Hubert D., 4,005,286.
Redmore, Derek; and Thompson, Neil E. S., to Petrolite Corporation. Preparation of α-amino phosphonic acid derivatives. 4,005,160, Cl. 260-970.000.
Reed Irrigation Systems: *See—*
Hinton, Melvin F., 4,005,013.
Rees, Gwilym James; and Bingham, Henry. Disc cutting units for use on rock boring machines. 4,004,645, Cl. 175-373.000.
Reese, Gunter; and Osberghaus, Rainer, to Henkel & Cie G.m.b.H. Process of suppressing odors employing deodorants containing esters of aliphatic hydroxycarboxylic acids. 4,005,189, Cl. 424-47.000.
Reichhold Chemicals, Inc.: *See—*
Distler, Edward C., 4,004,784.
Reigning Spirit of Truth: *See—*
Todd, James M., 4,004,547.
Reiner, Roland, to Hoffmann-La Roche Inc. 6-Acyl derivatives of aminopenicillanic acid. 4,005,073, Cl. 260-239.100.
Research Association for the Paper and Board Printing and Packaging Industries, The: *See—*
Hawkes, Charles Vivian, 4,005,165.
Research Corporation: *See—*
Gardiner, Duncan, 4,005,039.
Kupchan, S. Morris; and Court, William A., 4,005,108.
Law, S. Edward, 4,004,733.
Reynard, Kennard A.; and Gerber, Arthur H., to Horizons Incorporated, a division of Horizons Research Incorporated. Catalytic preparation of soluble poly(dichlorophosphazenes). 4,005,171, Cl. 423-300.000.
Reynolds, George A., to Eastman Kodak Company. Pyrylium dyes having a fused, rigidized nitrogen-containing ring. 4,005,092, Cl. 260-287.00P.
Reynolds, Thomas J., to Western Gear Corporation. Riser tension system for floating platform. 4,004,532, Cl. 114-256.000.
Rezabek, Karel: *See—*
Semonsky, Miroslav; Cerny, Antonin; Nemecek, Oldrich; Rezabek, Karel; Seda, Miroslav; Trcka, Vaclav; and Grimova, Jaroslava, 4,005,090.
Rheem Manufacturing Company: *See—*
Velarde, Clyde R., 4,004,339.
Rhodes, Melvin H., to Rockwell International Corporation. Squaring circuit apparatus. 4,005,283, Cl. 235-194.000.
Rhodes, Melvin H., to Rockwell International Corporation. Analog signal to duty cycle conversion apparatus. 4,005,284, Cl. 235-194.000.
Rhone-Poulenc Industries: *See—*
Biola, Georges; Fabre, Alain; and Schneider, Gerard, 4,005,114.
Ledru, Pierre, 4,004,959.
Rhone-Poulenc S.A.: *See—*
Bargain, Michel, 4,005,154.
Debarre, Francois; Jeanmart, Claude; and Simon, Pierre Edouard, 4,005,212.
Rials, Elbert O. Support device for use with a towel or the like. 4,004,315, Cl. 15-209.00R.
Rice, Jeffrey Clarus: *See—*
Tucker, Terry Allen; and Rice, Jeffrey Clarus, 4,005,416.
Richard, Gerard Yves, to Societe d'Applications de Procedes Industriels et Chimiques S.A.P.I.C. Process and apparatus for cleaning particulate materials. 4,004,942, Cl. 134-25.00R.
Richardson, Donald M.: *See—*
Bamberger, Carlos E.; and Richardson, Donald M., 4,005,184.
Richter, Bela: *See—*
Haas, Werner E. L.; Adams, James E., Jr.; and Richter, Bela, 4,005,032.
Richter Gedeon Vegyeszeti Gyar Rt.: *See—*
Fabry, Gyorgy; Takacs, Istvan; and Kiszely, Gyorgy, 4,004,609.
Mago nee Karacsony, Erzsebet; Borsi, Jozsef; Csanyi, Endre; Pik, Katalin; and Wolf, Lajos, 4,005,089.
Richter, Julian. Lockable cover for push button telephones. 4,005,279, Cl. 179-189.00D.
Ricoh Co., Ltd.: *See—*
Yamauchi, Satoshi, 4,004,354.
Riddle, Neville L.: *See—*
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Riedel, Guenther: *See—*
Gottschalk, Peter; Schoellig, Alfred; and Riedel, Guenther, 4,005,066.
Rieter Machine Works, Ltd.: *See—*
Graf, Felix; and Wirz, Armin, 4,005,302.
Weber, Kurt, 4,004,820.
Riker Laboratories, Inc.: *See—*
Banitt, Elden H.; and Bronn, William R., 4,005,209.
Rios, Donald J. Lamp-starting device. 4,005,338, Cl. 315-362.000.
Rippel, Richmond Henry: *See—*
Gendrich, Ronald Lee; Rippel, Richmond Henry; and Seely, John Hunter, 4,005,063.
Ritzmann, Horst: *See—*
Rohrbach, Rudolf; and Ritzmann, Horst, 4,004,938.
Robba, Max Fernand; and Aurousseau, Michel Emile Marie, to Innothera. Substituted thienyl-acetic acid esters. 4,005,095, Cl. 260-293.680.
Robert Bosch G.m.b.H.: *See—*
Blum, Rudolf, 4,005,351.
Heilmann, Wolfgang; Groetzner, Kurt; and Frohnwieser, Bernhard, 4,005,380.
Roberts, James L.: *See—*
Gale, Preston Lee; and Roberts, James L., 4,004,889.
Robertshaw Controls Company: *See—*
Feuer, Mervyn L., 4,005,409.
Robillard, Gene A., to Honeywell Inc. Photodetector mounting and connecting. 4,005,288, Cl. 250-239.000.
Robins Industries Corporation: *See—*
Post, Herman D.; and Scher, Seymour, 4,004,314.
Roch, Roger, to J. Bobst & Fils S.A. Equipment for introduction of a strip of paper, cardboard or similar material into a printing machine. 4,004,510, Cl. 101-228.000.
Rocholl, Hans; and Klein, Willi, to Bergische Stahl-Industrie. Closure for brake jaw holder for disc brakes. 4,004,659, Cl. 188-244.000.
Rockwell International Corporation: *See—*
Beccario, Michael J., 4,005,432.
Pentecost, Eugene E., 4,004,852.
Quintana, Leo J., 4,004,957.
Rhodes, Melvin H., 4,005,283.
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Roder, Kurt: *See—*
Nusslein, Ludwig; Pieroh, Ernst Albrecht; and Roder, Kurt, 4,005,213.
Roderick, Zachary A., to Galgon Industries, Inc. Clutch assembly with floater plate and shock canisters. 4,004,669, Cl. 192-70.170.
Rodriguez, Pedro A.; Heckert, David C.; and Watt, David M., Jr., to Procter & Gamble Company, The. Rinse aid composition containing an organosilane. 4,005,024, Cl. 252-89.00R.
Rogers, Robert E.: *See—*
Dykes, Dewey B.; Powers, E. Michael; Foster, T. Kenneth; and Rogers, Robert E., 4,005,226.
Rohr Industries, Inc.: *See—*
Shepard, Robert W.; and Heffner, George R., 4,004,392.
Rohrbach, Rudolf; and Ritzmann, Horst, to Polysius AG; and Rohrbach, Rudolf. Method and apparatus for manufacturing cement clinker. 4,004,938, Cl. 106-100.000.
Rolfe, Nicholas: *See—*
Colebourne, Neville; Rolfe, Nicholas; and McAloon, Kevin Thomas, 4,005,232.
Rollei-Werke Franke & Heidecke: *See—*
Papke, Friedrich, 4,005,462.
Ronner, Fritz, to BUSS Aktiengesellschaft. Mixing and kneading machine. 4,004,788, Cl. 259-191.000.
Roosild, Sven A.; Shepherd, Freeman D., Jr.; and Yang, Andrew C., to United States of America, Air Force. Low beam velocity retina for Schottky infrared vidicons. 4,005,327, Cl. 313-367.000.
Rorrer, Robert J.: *See—*
Spence, Junior C.; Rorrer, Robert J.; and Holt, James L., 4,004,617.
Rosen, Arye: *See—*
Ho, Pang-Ting; and Rosen, Arye, 4,005,372.
Rosen, George, to Sun Chemical Corporation. Photopolymerizable compounds and compositions comprising the product of the reaction

of a hydroxy-containing ester and a monocarboxy-substituted benzophenone. 4,004,998, Cl. 204-159.220.
Rosen, Kenneth M.: *See—*
Amelio, Armand F.; and Rosen, Kenneth M., 4,004,416.
Rosen, Perry: *See—*
Kienzle, Frank; and Rosen, Perry, 4,005,110.
Rosen, Sidney. Fluid filling machine. 4,004,620, Cl. 141-137.000.
Rosenfeld, Marvin L. Dental floss holder. 4,004,599, Cl. 132-92.00R.
Ross, Daniel Louis; and Barton, Lucian Anthony, to RCA Corporation. Method of recording information in which the electron beam sensitive material contains 4,4'-bis(3-diazo-3-4-oxo-1-naphthalene sulfonyloxy)benzil. 4,005,437, Cl. 346-165.000.
Ross, Jackson E. Collapsible coat hanger. 4,004,721, Cl. 223-89.000.
Rossing, Thomas D.: *See—*
Kaminsky, Manfred S.; Das, Santosh K.; and Rossing, Thomas D., 4,004,890.
Roth, Walter L.: *See—*
Farrington, Gregory C.; and Roth, Walter L., 4,004,946.
Rothwell, Maurice: *See—*
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Roussel-UCLAF: *See—*
Gaignault, Jean-Cyr; Vacher, Jean; and Frechet, Daniel, 4,005,206.
Goffinet, Bernard, 4,005,146.
Rowe, George E., deceased (by Rowe, Selma S., executrix), to Emhart Industries, Inc. Glassware forming machine of the I. S. type for upright press and blow process. 4,004,906, Cl. 65-239.000.
Rowe, Selma S., executrix: *See—*
Rowe, George E., deceased, 4,004,906.
Rowenta-Werke GmbH: *See—*
Lamprecht, Adolf, 4,005,343.
Rowland-Hill, Edward W.; and Thomas, Louis R., Jr., to Sperry Rand Corporation. Rotary combine with improved concave. 4,004,404, Cl. 56-14.600.
Rubin, Arnold D., to Schnadig Corporation. Sleeper sofa and mattress combination. 4,004,305, Cl. 5-352.000.
Rubin, Wolfgang, to Lohr & Bromkamp GmbH. Device for non-rotatably securing the outer member of a joint to a flange or shaft. 4,004,435, Cl. 64-32.00R.
Ruch, Heinz, to Albert Obrist AG. Method for molding plastic covers for containers. 4,005,101, Cl. 264-318.000.
Rudolph, Werner; and Massonne, Joachim, to Kali-Chemie Aktiengesellschaft. Process for the purification and separation of perhaloalkanoic acids from mixtures thereof with perhaloalkanes. 4,005,137, Cl. 260-539.00R.
Rudolph, Werner: *See—*
Fernschild, Gunter; Rudolph, Werner; and Massonne, Joachim, 4,005,176.
Runge, Thomas M. Cardiac replacement and assist devices. 4,004,299, Cl. 3-1.700.
Russell, Lewis K.: *See—*
Tucci, Patrick A.; and Russell, Lewis K., 4,005,470.
Ruter, Jorn: *See—*
Magosch, Karl-Heinz; and Ruter, Jorn, 4,004,878.
Ryan, James; and Vandenberg, Robert W., to Gerber Products Company. Machine fillable envelope. 4,004,728, Cl. 229-76.000.
Rygalin, Viktor Georgievich: *See—*
Yakshin, Alexandr Sergeevich; Novikov, Oleg Nikolaevich; Grechinsky, Dmitry Alexeevich; Klochko, Viktor Alexandrovich; and Rygalin, Viktor Georgievich, 4,004,450.
Saab-Scania Aktiebolag: *See—*
Gardell, Lars Johan; and Wilhelmsson, Bertil Lennart, 4,004,650.
Nilsson, Jan; and Swanson, Rune, 4,005,319.
Saarstickstoff-Fatol GmbH: *See—*
Freerksen, Enno, 4,005,207.
Sabacky, Milton J.: *See—*
Knowles, William S.; Sabacky, Milton J.; and Vineyard, Billy D., 4,005,127.
Sackenreuter, Hans; and Politzer, Anton, to DIEHL. Rotatable cartridge chamber for firearm type weapon. 4,004,363, Cl. 42-9.000.
Saeman, Walter C., to Olin Corporation. Spray graining technique for preparing granular hydrated alkali metal dihaloisocyanurate. 4,005,087, Cl. 260-248.00C.
Saft-Societe des Accumulateurs Fixes et de Traction: *See—*
Lemaire, Gilbert, 4,005,061.
Saintours-Payerne, Bruno M.: *See—*
Mechulam, Andre; Saintours-Payerne, Bruno M.; Gay-Chatain, Guillaume A.; and Montjallard, Paul R., 4,004,494.
Salesky, Emery; and Luehman, Kent W., to Hewlett-Packard Company. Transient elimination circuit. 4,005,373, Cl. 330-51.000.
Salve S.A.: *See—*
Palmius, Kjell Hubert, 4,004,578.
Sampson, Keith George; Jenkins, Victor Frederick; and Bunker, Anthony John, to Laporte Industries Limited. Polymeric compositions. 4,005,155, Cl. 260-851.000.
Sanchez, Carmelo: *See—*
Burzlaff, Karl H.; and Sanchez, Carmelo, 4,004,673.
Sandco Ltd.: *See—*
Guttinger, Manfred; and Schermutzki, Konrad, 4,004,870.
Sanden, Gertrud Marianne: *See—*
Sanden, Stig Ingemar; and Sanden, Gertrud Marianne, 4,004,813.
Sanden, Stig Ingemar; and Sanden, Gertrud Marianne. Lottery-ticket assembly. 4,004,813, Cl. 273-139.000.
Sandera, Josef; Csalabek, Milan; Cenek, Miroslav; Koudelka, Vojtech; Kouril, Oldrich; Malik, Jiri; and Vanacek, Josef, to Prazska akumulatorka, narodni podnik. Electrode material for accumulators and other electrochemical sources of current. 4,004,944, Cl. 429-215.000.
Sanderson, Edward L.: *See—*
Higgins, Francis J.; McGraw, Charles T.; and Sanderson, Edward L., 4,004,540.
Sandiford, Burton B., to Union Oil Company of California. Selectively plugging the more permeable strata of a subterranean formation. 4,004,639, Cl. 166-292.000.
Sandoz Ltd.: *See—*
Dore, Jacky, 4,005,067.
Koch, Werner, 4,005,080.
Zirngibl, Ulrich, 4,005,069.
Sandstrom, Paul H.; and Lal, Joginder, to Goodyear Tire & Rubber Company, The. Pneumatic tire with sidewall composition. 4,004,627, Cl. 152-355.000.
Sandvik Aktiebolag: *See—*
Liljekvist, Bernt Soren; and Persson, Anders, 4,004,644.
Sankyo Company Limited: *See—*
Murayama, Keisuku; Moriyama, Syoji; Yoshioka, Takao; Toda, Toshimasa; Mori, Eiko; Horiuchi, Hideo; Higashida, Susumu; Matsui, Katsuaki; Kurumada, Tomoyuki; Ohata, Noriyuki; and Ohsawa, Hisayou, 4,005,094.
Sanneman, Douglas D.; Stalder, Ernest; and Chaffee, Robert C., to Gilmore-Tatge Manufacturing Co., Inc. Grain drying apparatus. 4,004,351, Cl. 34-52.000.
Sano, Ryuichi: *See—*
Tsukamoto, Kenkichi; Matsumura, Yusuke; and Sano, Ryuichi, 4,004,997.
Saphir, Johannes R., to Carl Brehmer & Sohn. Hair dye and its use. 4,004,877, Cl. 8-10.000.
Sarnoff, Stanley J., to Survival Technology, Inc. Method of treating heart attack patients prior to the establishment of qualified direct contact personal care. 4,004,577, Cl. 128-2.06R.
Sarstedt, Walter, to Walter Sarstedt Kunststoff-Spritzgusswerk. Apparatus for loading blood extracting devices. 4,004,575, Cl. 128-2.00F.
Sartorius-Werke GmbH (und. vorm. Gottinger Prazisionswaagenfabrik GmbH): *See—*
Knothe, Erich; Melcher, Franz Josef; and Berg, Christoph, 4,004,458.
Sato, Fumihiko: *See—*
Shibayama, Kyoichi; Sato, Fumihiko; and Takahama, Takashi, 4,004,999.
Sato, Hiroki; and Takahashi, Hiroh, to Sony Corporation. Method and apparatus for producing a composite still picture of a moving object in successive positions. 4,005,261, Cl. 358-83.000.
Satoh, Ken, to Olympus Optical Co., Ltd. Apparatus for detecting tape running in a tape recorder. 4,005,486, Cl. 360-79.000.
Sauer, Richard W., deceased: *See—*
Zehner, Lee R.; Sauer, Richard W., deceased; and Heffron, John J., executor, 4,005,128.
Saunders, Leonard M.; and Sieger, Earl W., to United States Steel Corporation. Preshaped blast furnace hearth construction. 4,004,791, Cl. 266-197.000.
Sautton, Guy, to Hotchkiss Brandt Sogeme. Envelope indexing head and an indexing apparatus equipped with same. 4,004,507, Cl. 101-93.420.
Savage, Donald D., to Powell, B. J., a part interest. Vehicle hub assembly. 4,004,838, Cl. 301-105.00R.
Savioli, Giulio V., to United States of America, America. Disintegrable cartridge link. 4,004,492, Cl. 89-35.00A.
Savla, Manilal: *See—*
Miron, Jerry; Savla, Manilal; and Skeist, Irving, 4,005,055.
Savonichev, Dmitry Nikolaevich: *See—*
Kabanov, Nikolai Pavlovich; Schukin, Vitaly Sergeevich; Knyazev, Jury Alexeevich; Makhalov, Sergei Fedorovich; Popov, Mikhail Ivanovich; Savonichev, Dmitry Nikolaevich; Shepelev, Dmitry Nikolaevich; Suvorov, Vladimir Nikolaevich; and Chalov, Vladimir Pavlovich, 4,004,723.
Schafer, Werner: *See—*
Hack, Helmuth; Munz, Ferdinand; Eue, Ludwig; and Schafer, Werner, 4,004,913.
Schappel, Robert Edouard: *See—*
Marquaire, Roger Andre Marie; Curtis, Michel Georges August; and Schappel, Robert Edouard, 4,004,635.
Scharkowitz, Eckhart: *See—*
Beinhauer, Manfred; and Scharkowitz, Eckhart, 4,005,478.
Schechter, Robert; and Winslade, Douglas W., to Western Electric Company, Inc. Methods and apparatus for wrapping a wire on a terminal. 4,004,743, Cl. 242-7.030.
Scheibe, Elias W., to General Motors Corporation. Hydraulic lash adjuster oil metering valve. 4,004,558, Cl. 123-90.350.
Scheier, Donald J.; and Haynes, Homer A., to Gordon Johnson Company. Apparatus for use in evisceration of poultry. 4,004,320, Cl. 17-11.000.
Scheinpflug, Hans: *See—*
Buchel, Karl Heinz; Kramer, Wolfgang; Kaspers, Helmut; and Scheinpflug, Hans, 4,005,083.
Schellhammer, Carl-Wolfgang: *See—*
Dorlars, Alfons; Schellhammer, Carl-Wolfgang; and Wirth, Wolf-Dieter, 4,005,098.
Schenk, Peter, to Dzus Fastener Co., Inc. Quick release fastener. 4,004,486, Cl. 85-64.000.
Schepp, Edwin F.; and Coffey, Ronald B., to Monsanto Company. Kitchen ware cleaning device. 4,004,376, Cl. 51-181.00R.
Scher, Seymour: *See—*
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Schering Aktiengesellschaft: *See—*
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Schermutzki, Konrad: *See—*
Guttinger, Manfred; and Schermutzki, Konrad, 4,004,870.
Scheuchzer, Fredy; and Buhler, Fritz, to Les Fils d'Auguste Scheuchzer S.A. Method of renewal of a railroad track and train therefor. 4,004,524, Cl. 104-2.000.
Scheuermann, Horst: *See—*
Mach, Wolfgang; and Scheuermann, Horst, 4,005,111.
Schibbye, Lauritz Benedictus, to Svenska Rotor Maskiner Aktiebolag. Method for modifying a compressing apparatus unit. 4,004,864, Cl. 418-1.000.
Schieber, Hans; Radl, Franz; Krause, Erich; and Schimko, Reinhold, to Universal Maschinenfabrik Dr. Rudolf Schieber KG. Flat knitting machine. 4,004,437, Cl. 66-78.000.
Schiffer, Stephen F.; and DiPasquale, Renato, to Yardney Electric Corporation. Reserve-type cell. 4,005,246, Cl. 429-94.000.
Schimko, Reinhold: *See—*
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Schlacter, Michael M., to Aeronutronic Ford Corporation. Germanium device passivation. 4,005,240, Cl. 428-333.000.
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Schliebs, Reinhard: *See—*
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Schmelow, Harald Martin: *See—*
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Schmerling, Louis, to Universal Oil Products Company. Preparation of haloalkyl esters. 4,005,125, Cl. 260-476.00R.
Schmerling, Louis, to Universal Oil Products Company. Preparation of haloalkyl esters. 4,005,126, Cl. 260-476.00R.
Schmerling, Louis, to Universal Oil Products Company. Cycloalkenynes and a method for the preparation thereof. 4,005,152, Cl. 260-648.00R.
Schmerling, Louis, to Universal Oil Products Company. Novel flame retardant compositions of matter. 4,005,156, Cl. 260-880.00R.
Schmid, Wolfgang, to Ciba-Geigy Corporation. Arylisothiocyanate for the regulation of plant growth. 4,004,907, Cl. 71-72.000.
Schmidt, Herbert: *See—*
Wochnowski, Waldemar; Thiele, Willi; Hohm, Reinhard; and Schmidt, Herbert, 4,004,594.
Schmidt, Joseph A.: *See—*
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Schneider, Gerard: *See—*
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Schneiter, Ali, to Ebauches S.A. Counting mechanism for timepiece. 4,004,411, Cl. 58-116.00M.
Schnell, Philip G., to Standard Oil Company (Indiana). Process of preparing water-soluble whippable extract from microorganism protein material. 4,005,062, Cl. 260-112.00R.
Schoellig, Alfred: *See—*
Gottschalk, Peter; Schoellig, Alfred; and Riedel, Guenther, 4,005,066.
Scholin, Harold W.; and Lisiecki, Hieronim L., to Scholin Industries, Inc. Automatic systems programmer. 4,004,497, Cl. 91-36.000.
Scholin Industries, Inc.: *See—*
Scholin, Harold W.; and Lisiecki, Hieronim L., 4,004,497.
Schoonman, Marten Leonard. Wave responsive hatch cover locking and sealing mechanism. 4,004,538, Cl. 114-201.00R.
Schoppee, Lawrence W., to Package Machinery Company. Gum slab feed apparatus. 4,004,797, Cl. 271-136.000.
Schotz, Larry A.: *See—*
Canell, George; and Schotz, Larry A., 4,005,268.
Schramm, Jurgen: *See—*
Sirrenberg, Wilhelm; Schramm, Jurgen; Klauke, Erich; and Hammann, Ingeborg, 4,005,223.
Schreiber, Gerald A., to Bartholomew, Limited. Board game apparatus. 4,004,809, Cl. 273-134.00C.
Schrengauer, Edwin Benedict: *See—*
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Schubert, Bernhard: *See—*
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Schuerba, Reinhard, to Siemens Aktiengesellschaft. Bipolar semiconductor memory with recharging circuit for capacitively loaded lines. 4,005,393, Cl. 340-173.0FF.
Schukin, Vitaly Sergeevich: *See—*
Kabanov, Nikolai Pavlovich; Schukin, Vitaly Sergeevich; Knyazev, Jury Alexeevich; Makhalov, Sergei Fedorovich; Popov, Mikhail Ivanovich; Savonichev, Dmitry Nikolaevich; Shepelev, Dmitry Nikolaevich; Suvorov, Vladimir Nikolaevich; and Chalov, Vladimir Pavlovich, 4,004,723.
Schuler, Stephen H., to Adamation, Inc. Type S chain. 4,004,682, Cl. 198-852.000.
Schultis, Klaus: *See—*
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Schulze, Wilhelm, to Maschinenbau Greene GmbH & Co., KG. Winding apparatus. 4,004,747, Cl. 242-56.500.
Schwarz, Gail B., to Measuregraph Company, The. Apparatus for dispensing fabric from a bolt. 4,004,748, Cl. 242-62.000.
Schwenk, George G.: *See—*
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Schwerzel, Robert E.; and Nathan, Richard A., to Battelle Development Corporation. Isomerization for photochemical solar energy storage. 4,004,571, Cl. 126-270.000.
Schwerzel, Robert E.: *See—*
Nathan, Richard A.; Schwerzel, Robert E.; Adelman, Albert H.; and Wyant, Robert E., 4,004,572.
Schwuttke, Guenter H.: *See—*
Gorey, Edward F.; and Schwuttke, Guenter H., 4,004,449.
Scollins, John A., to United States of America, Navy. Fuze protector cap. 4,004,684, Cl. 206-3.000.
Scott, Lewis A.: *See—*
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Scott Paper Company: *See—*
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Seckinger, Hans: *See—*
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Seeling, Ernest Richard, to United States of America, Army. Plastic ammunition belt. 4,004,491, Cl. 89-35.00R.
Seely, John Hunter: *See—*
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Segurens, Louis: *See—*
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Seki, Mitsuaki; and Nakazawa, Tamotu, to Canon Kabushiki Kaisha. Clearing system. 4,005,386, Cl. 340-172.500.
Sekiguchi, Yoshimitu: *See—*
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Sekmakas, Kazys, to DeSoto, Inc. Aqueous polymerization of unsaturation carboxylic acid monomers using anionic surfactant mixed with the monomer and polyhydric alcohol prior to reaction. 4,005,052, Cl. 260-29.6TA.
Seko, Maomi; Ogawa, Sininsaku; Yoshida, Mitsuo; and Nakamura, Akira, to Asahi Kasei Kogyo Kabushiki Kaisha. Electrode coating consisting of a solid solution of a noble metal oxide, titanium oxide, and zirconium oxide. 4,005,004, Cl. 204-290.00F.
Selegny, Eric: *See—*
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Senet, Jean-Pierre G., to Societe Nationale des Poudres et Explosifs. Process for the preparation of oligocarbonates with two catalysts. 4,005,121, Cl. 260-463.000.
Seo, Ryozo: *See—*
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Shepard, Robert W.; and Heffner, George R., to Rohr Industries, Inc. Molded plastic key molded joint and method of forming same. 4,004,392, Cl. 52-436.000.
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Shibata, Shin; and Oguchi, Kikuo, to Kabushiki Kaisha Suwa Seikosha. Quartz crystal vibrator mounting. 4,005,321, Cl. 310-9.100.
Shibayama, Kyoichi; Sato, Fumihiko; and Takahama, Takashi, to Mitsubishi Denki Kabushiki Kaisha. Process for preparing a coated product. 4,004,999, Cl. 204-181.000.
Shimada, Seiko: *See—*
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Shimada, Takafumi: *See—*
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Sieger, Earl W.: *See—*
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Sigmatex, A.G.: *See—*
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Singer, Leonard Sidney, to Union Carbide Corporation. High modulus, high strength carbon fibers produced from mesophase pitch. 4,005,183, Cl. 423-447.200.
Singh, Gurdial; and von Rutte, Richard Edward, to Du Pont de Nemours, E. I., and Company. Antistatic composition containing an N-alkyl polycarbonamide and a phosphonium salt. 4,005,057, Cl. 260-78.00S.
Singh, Tej Kuldip: *See—*
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Sjogren, Christer A., to Eds Inc. Extractor assembly for extracting and/or diverting a selected number of signatures from a stream. 4,004,694, Cl. 209-111.70R.
Skahill, Fred J.: *See—*
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Skillern, Scott D., to Van Aman, Robert H. Treatment of acne vulgaris. 4,005,198, Cl. 424-227.000.
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Slavinski, Antoni. Hair rollers. 4,004,595, Cl. 132-40.000.
Slobodnik, Andrew J., Jr.; and Laker, Kenneth R., to United States of America, Air Force. Surface acoustic wave filter. 4,005,378, Cl. 333-72.000.
Smith, Carleton H.; and Dunning, Kenneth G. Battery plate grid. 4,004,945, Cl. 429-244.000.
Smith, Charles, to Dow Corning Limited. Treatment of fibres. 4,005,231, Cl. 427-387.000.
Smith, Edmund Haislett, Jr.: *See—*
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Smith, James Thomas: *See—*
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Smith Kline & French Laboratories Limited: *See—*
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Walker, Walter P.; Smith, Leary W.; Cofer, Frank H., Jr.; and Lewis, Jack E., 4,005,491.
Smith, Warren K., to United States of America, Navy. Paint-on thermocouple. 4,004,948, Cl. 136-201.000.

Smith, William E., to General Electric Company. Multistep method for preparation of tetrahydrofuran starting from propylene, oxygen and a carboxylic acid. 4,005,112, Cl. 260-346.10R.

Smith, William E., to General Electric Company. Multi-step process for preparation of tetrahydrofuran starting from propylene, oxygen and a carboxylic acid. 4,005,113, Cl. 260-346.10R.

SmithKline Corporation: *See—*
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Smola, Frank M.; and Breton, Henri E., to Eastman Kodak Company. Chromatographic spotter. 4,004,548, Cl. 118-58.000.

Smoot, William N. Resonant frequency measuring device for gauging coating thickness. 4,005,359, Cl. 324-34.0TK.

Snodgrass, Robert E.; and Tyler, Michael N., to United States of America, Army. M16A1 Burst control. 4,004,496, Cl. 89-129.00B.

Snyder, George E., to General Motors Corporation. Fluid baffle in master cylinder reservoir. 4,004,707, Cl. 220-22.000.

Sochor, Jerzy R., to Elco Corporation. High density electrical connector employing male blade with offset portions. 4,004,845, Cl. 339-258.00P.

Societa' Italiana Resine S.I.R. S.p.A.: *See—*
Calcagno, Benedetto; Piccolo, Luigi; Paolinelli, Antonio; Cozza, Giorgio; and Bottai, Gabriele, 4,005,175.

Societe Anonyme dite: Hexachimie: *See—*
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Societe d'Applications de Procedes Industriels et Chimiques S.A.P.I.C.: *See—*
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Societe d'Assistance Technique pour Produits Nestle S.A.: *See—*
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Societe d'Estampage et de Forge Ardennes Champagne-Sefac: *See—*
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Societe d'Exploitation des Ressorts Auto-Amortisseurs Jarret: *See—*
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Societe Franco-Americaine de Constructions Atomiques-Framatome: *See—*
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Societe Nationale des Poudres et Explosifs: *See—*
Senet, Jean-Pierre G., 4,005,121.

Societe Suisse pour l'Industrie Horologere Management Services S.A.: *See—*
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Sogabe, Yoji; Edamatsu, Tetsuo; and Oka, Takashi, to Nissan Motor Co., Ltd.; and Kohkoku Chemical Industry Co., Ltd. Vehicle safety device using an inflatable confinement and method of folding the inflatable confinement. 4,004,828, Cl. 280-743.000.

Solomon, Stephen M.; Shaievitz, Sidney; and Marshall, Louis, to Lummus Company, The. Process and apparatus for treating natural gas. 4,004,430, Cl. 62-18.000.

Solvay & Cie: *See—*
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Sony Corporation: *See—*
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Hongu, Masayuki; and Tada, Masahiro, 4,005,371.
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Matsumoto, Isao; and Umeda, Kenkichi, 4,005,480.
Sato, Hiroki; and Takahashi, Hiroh, 4,005,261.

Soo, Shao L., to University of Illinois Foundation. Production of water gas. 4,004,896, Cl. 48-202.000.

Soobik, Lembit, to Texas Instruments Incorporated. Circuit for controlling a display device. 4,005,404, Cl. 340-336.000.

Soper, William G.: *See—*
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Sopryazhinsky, Vadim Mikhailovich: *See—*
Zverev, Anatoly Ivanovich; Bondarenko, Alexandr Sergeevich; Pudzinsky, Mikhail Antonovich; Sopryazhinsky, Vadim Mikhailovich; and Yakshin, Nikolai Alexeevich, 4,004,735.

Sorgatz, Ulrich; and Ammesdorfer, Fritz, to Volkswagenwerk Aktiengesellschaft. Shock absorber with different damping effects at different parts of stroke. 4,004,662, Cl. 188-284.000.

Sorm, Frantisek; Svoboda, Miroslav; Zavada, Jiri; Slama, Karel; and Arnold, Zdenek, to Ceskoslovenska akademie ved. Phenyl ethers having juvenile hormone activity. 4,005,150, Cl. 260-613.00D.

Soufflet, Jean-Pierre: *See—*
Chauvin, Yves; Commereuc, Dominique; Cruypelinck, Daniel; and Soufflet, Jean-Pierre, 4,005,047.

Soules, Charl. Wind driven prime mover. 4,004,861, Cl. 416-41.000.

Sound Technology, Inc.: *See—*
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Span-Deck, Inc.: *See—*
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Speakman, Eugene R., to McDonnell Douglas Corporation. Crowned flush head rivet. 4,004,484, Cl. 85-37.000.

Speco, Inc.: *See—*
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Spence, Junior C.; Rorrer, Robert J.; and Holt, James L., to J. P. Stevens & Co., Inc. Method for forming a double catch thread narrow weave. 4,004,617, Cl. 139-416.000.

Spencer, Michael Staines: *See—*
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Spendlove Laboratories: *See—*
Spendlove, Rex S., 4,004,322.

Spendlove, Rex S., to Spendlove Laboratories. Aseptic serum collection method. 4,004,322, Cl. 17-51.000.

Spengos, Aris Constantine: *See—*
Gotchel, Joel Peter; Norton, Henry James; Spengos, Aris Constantine; and Vaalburg, Lawrence, 4,004,323.

Sperry Rand Corporation: *See—*
Duncan, Damon H.; Herdman, Craig T.; and Littlejohn, Terrance V., 4,005,490.
Fosler, Dick E., Jr.; and Krocheski, Thomas L., 4,005,395.
Rowland-Hill, Edward W.; and Thomas, Louis R., Jr., 4,004,404.
Tucker, Terry Allen; and Rice, Jeffrey Clarus, 4,005,416.

Spicer, Larry Dean; Pensack, Joseph Michael; Wilbur, Robert Daniel; and Demkovich, Gary Michael, to American Cyanamid Company. Ureidotetralin compounds. 4,005,140, Cl. 260-553.00A.

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Spofa United Pharmaceutical Works: *See—*
Semonsky, Miroslav; Cerny, Antonin; Nemecek, Oldrich; Rezabek, Karel; Seda, Miroslav; Trcka, Vaclav; and Grimova, Jaroslava, 4,005,090.

Squires, Arthur M. Treating gas and fine granular material in panel bed. 4,004,350, Cl. 34-33.000.

Squires, Arthur M. Filtering dusty gas in improved panel bed. 4,004,897, Cl. 55-96.000.

Staahl, Joseph R., Jr.; Matesa, Joseph M.; and Worth, David E., to PPG Industries, Inc. Manufacture of flat glass at controlled throughput rate. 4,004,900, Cl. 65-29.000.

Stalder, Ernest: *See—*
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Stalego, Joseph P., to Owens-Corning Fiberglas Corporation. Frothed molding compositions. 4,005,036, Cl. 260-2.50F.

Stamicarbon B.V.: *See—*
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Standard Oil Company: *See—*
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Standard Oil Company (Indiana): *See—*
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Fields, Ellis K., 4,005,049.
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Stanley, Robert K., to Techniservice Division Textured Yarn Co., Inc. Textile treatment apparatus. 4,004,330, Cl. 28-1.600.

Starr, Eugene W., to PPG Industries, Inc. Tempering glass sheets. 4,004,901, Cl. 65-114.000.

Stauffer Chemical Company: *See—*
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Weil, Edward D., 4,005,034.

Stayner, Robert A., to Chevron Research Company. Electrical discharge machining process with fluid containing a cationic organic surfactant. 4,005,304, Cl. 219-69.00D.

Stecklein, Gary Lee, to Deere & Company. Articulated joint including seals maintained by wedge. 4,004,855, Cl. 403-158.000.

Steels, Gordon, to Baker Perkins Holdings Limited. Apparatus for dispensing confectionery. 4,004,716, Cl. 222-145.000.

Stefanik, John E., to PPG Industries, Inc. Window panel edge construction. 4,004,388, Cl. 52-398.000.

Steffen, Vincent B. Grain drying apparatus. 4,004,352, Cl. 34-233.000.

Steiger, Edward L.: *See—*
Dietrich, Heinz J.; and Steiger, Edward L., 4,005,064.

Steinhagen, George J. Portable roof winch. 4,004,778, Cl. 254-142.000.

Steinmaier, Walter: *See—*
Le Can, Claude Jan Principe Frederic; Kooi, Else; and Steinmaier, Walter, 4,005,453.

Stender, Carl H., to Champlin Petroleum Company. Ball valve. 4,004,776, Cl. 251-315.000.

Stenstrom, Lennart Arvid, to Alfa-Laval AB. Heat treating apparatus for liquids. 4,004,553, Cl. 122-26.000.

Stephens, Paul B. Method and apparatus for removing set mortar from recovered building bricks. 4,004,569, Cl. 125-26.000.

Stephens, Will R., to Barnard & Leas Manufacturing Co. Inc. Stirring device. 4,004,786, Cl. 259-107.000.

Sterling Drug Inc.: *See—*
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Zenitz, Bernard L., 4,005,093.

Stern, David, to Imperial Chemical Industries Limited. Plasticizing apparatus. 4,005,167, Cl. 264-329.000.

Stern, Erika, heir: *See—*
Stern, Hans, deceased; and Strauss, Werner, 4,004,615.

Stern, Hans, deceased (by Stern, Erika, heir); and Strauss, Werner, to Klockner-Humboldt-Deutz Aktiengesellschaft. Parts subject to wear in separators, cyclones, pipelines and similar apparatus. 4,004,615, Cl. 138-177.000.

Steury, Howard C.: *See—*
Woody, Albert L.; Audiffred, Sidney J.; and Steury, Howard C., 4,004,417.

Stewart, Ronald K.; and Insley, Robert H., to Champion Spark Plug Company. Tantalum or niobium-modified resistor element. 4,005,050, Cl. 252-521.000.

Stibbe, Robert L., to Warner Electric Brake & Clutch Company.

Electrically controlled brake assembly with non-cocking operating arm. 4,004,663, Cl. 188-332.000.

Stichting Speurwerk Baggertechniek: *See—*
van Os, Adriaan Gabriel, 4,004,358.

Stickney, Dwight R.; Simmons, William S.; Nichol, Charles A.; Hitchings, George H.; and Elion, Gertrude B., to Burroughs Wellcome Co. Treatment of meningeal leukemia with diamino dichlorophenyl pyrimidine. 4,005,203, Cl. 424-251.000.

Stickney, Dwight R.; Simmons, William S.; Nichol, Charles A.; Hitchings, George H.; and Elion, Gertrude B., to Burroughs Wellcome Co. Treatment of neoplasms in the brain with diamino dichloroalkyl pyrimidine. 4,005,204, Cl. 424-251.000.

Stoll, Max: *See—*
Winter, Max; Gautschi, Fritz; Flament, Ivon; Stoll, Max; and Goldman, Irving M., 4,005,227.

Stone, John Neil: *See—*
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Stone, W. James: *See—*
Burklund, Vernon D.; Stone, W. James; and Schmidt, Joseph A., 4,004,764.

Stoner, Jesse A., to General Electric Company. Apparatus for assembling components of a dynamoelectric machine. 4,004,725, Cl. 228-49.000.

Stoody Company: *See—*
Zvanut, Albert J.; and Nakabayashi, Masahiro, 4,005,309.

Stormont, James D., to Tenneco Inc. Catalytic converter having a resilient thermal-variation compensating monolith-mounting arrangement. 4,004,887, Cl. 23-288.0FC.

Stotz, Wolf-Gunter: *See—*
Braun, Heinz; Dahl, Hans; Hefter, Jost; and Stotz, Wolf-Gunter, 4,004,968.

Straits Steet & Wire Co.: *See—*
King, Clarence J., 4,004,526.

Strandberg, Hasse Eivind: *See—*
Johnston, Gordon Boyd; and Strandberg, Hasse Eivind, 4,004,840.

Strange, Robert F., to Bausch & Lomb Incorporated. Electrographic printer paper tensioning device. 4,004,749, Cl. 242-75.400.

Strauss, Werner: *See—*
Stern, Hans, deceased; and Strauss, Werner, 4,004,615.

Strelchenko, Vladimir Sergeevich; and Gomlyakov, Valery Ilich. Machine for longitudinal multipass knurling of profiles. 4,004,442, Cl. 72-214.000.

Stripling, Michael H.: *See—*
Pryor, Cabell N., Jr.; Hug, Edward; and Stripling, Michael H., 4,005,384.

Strom, Stephen S.: *See—*
Matty, Robert E.; and Strom, Stephen S., 4,004,966.

Strombeck, Leo: *See—*
Anderson, Ralph F.; and Strombeck, Leo, 4,004,400.

Stroupe, James D., to Sipler Plastics, Inc. Tubular article and method of making the same. 4,005,234, Cl. 428-36.000.

Stubben GmbH, Riding Equipment: *See—*
Bischeltsrieder, Lorenz, 4,004,402.

Studiengesellschaft Kohle m.b.H.: *See—*
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Su, Chauchang: *See—*
Lundquist, David E.; Hoffman, Paul R.; Su, Chauchang; Sung, Benjamin T.; and Eichhardt, Steven A., 4,005,435.

Subhedar, Jayant W., to General Motors Corporation. Leaf spring suspension system. 4,004,826, Cl. 280-718.000.

Subsea Equipment Associates Limited: *See—*
Marquaire, Roger Andre Marie; Curtis, Michel Georges August; and Schappel, Robert Edouard, 4,004,635.

Suetsuna, Airi; and Iio, Toshimasa, to Sumitomo Metal Mining Co., Limited. Process for separating and recovering nickel and cobalt. 4,004,990, Cl. 204-113.000.

Suga, Shigeru. Carbon electrode for emitting light similar to sunshine for light-fastness testing. 4,005,325, Cl. 313-352.000.

Suga, Shigeru. Electrode mounting in an arc lamp for use in light fastness testers. 4,005,326, Cl. 313-357.000.

Sultan, Stig Bertil: *See—*
Amberntsson, Jan Roger; Andersson, Rober Ingemar; and Sultan, Stig Bertil, 4,005,440.

Sumi, Shozo: *See—*
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Sumitomo Chemical Company, Limited: *See—*
Yamada, Hirotada; Tobiki, Hisao; Nakatsuka, Iwao; Tanno, Norihiko; Shimago, Kozo; and Nakagome, Takenari, 4,005,075.

Sumitomo Light Metal Industries, Ltd.: *See—*
Baba, Yoshio; and Takashima, Akira, 4,005,243.

Sumitomo Metal Mining Co., Limited: *See—*
Suetsuna, Airi; and Iio, Toshimasa, 4,004,990.

Sumner, William David: *See—*
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Sun Chemical Corporation: *See—*
Helding, Norman A., 4,005,135.
Rosen, George, 4,004,998.

Sun Electric Corporation: *See—*
Trussell, Gerald C., 4,005,356.

Sundberg, Sture Ingemar: *See—*
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Sung, Benjamin T.: *See—*
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Supfina Maschinenfabrik Hentzen KG: *See—*
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Surhigh, Lawrence A.: *See—*
Podolan, Edward G.; and Surhigh, Lawrence A., 4,004,371.

Surmatis, Joseph Donald, to Hoffmann-La Roche Inc. Nickel peroxide oxidizing agent. 4,005,031, Cl. 252-186.000.

Surna, Janis Alexandrovich: *See—*
Pormale, Milda Jaovna; Kashkina, Nadezhda Alexandrovna; Kalninsh, Arvid Janovich; Sergeeva, Varvara Nikolaevna; Surna, Janis Alexandrovich; Shusters, Janis; Melzobs, Modris Jaowich; Mikazhan, Waldis Danielowich; Purwinsh, Indulis Waldowich; Skutelis, Antons Petrowich; and Liepinsh, Martinsh Aleksandrowich, 4,005,070.

Survival Technology, Inc.: *See—*
Sarnoff, Stanley J., 4,004,577.

Sustarsic, John D.: *See—*
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Suvorov, Vladimir Nikolaevich: *See—*
Kabanov, Nikolai Pavlovich; Schukin, Vitaly Sergeevich; Knyazev, Jury Alexeevich; Makhalov, Sergei Fedorovich; Popov, Mikhail Ivanovich; Savonichev, Dmitry Nikolaevich; Shepelev, Dmitry Nikolaevich; Suvorov, Vladimir Nikolaevich; and Chalov, Vladimir Pavlovich, 4,004,723.

Suzuki, Hirotsugu; Ogawa, Yo; Kikuchi, Yoshikazu; and Kitazawa, Shin-ichi, to Toray Industries, Inc. Spun type yarn and process for manufacturing the same. 4,004,406, Cl. 57-140.00R.

Suzuki, Masayoshi: *See—*
Takasuga, Yutaka; Nishimura, Seiichiro; and Suzuki, Masayoshi, 4,004,961.

Suzuki, Mikiji: *See—*
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Suzuki, Satosi: *See—*
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Svenska Rotor Maskiner Aktiebolag: *See—*
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Svezhinina, Julia Anatolievna: *See—*
Chumakov, Mikhail Petrovich; Prokhorova, Inna Alexandrovna; Grachev, Viktor Pavlovich; Petukhova, Valentina Vasilievna; Svezhinina, Julia Anatolievna; Mironova, Ljubov Leonidovna; Ralf, Ninel Mikhailovna; Popova, Valentina Dmitrievna; Mustafina, Aida Nurislamovna; and Chernyshev, Vladimir Ivanovich, 4,004,974.

Svoboda, Josef, to Gertsch AG. Guide plate for ski bindings. 4,004,824, Cl. 280-636.000.

Svoboda, Miroslav: *See—*
Sorm, Frantisek; Svoboda, Miroslav; Zavada, Jiri; Slama, Karel; and Arnold, Zdenek, 4,005,150.

Swan, Brita; and Gustavsson, Rune, to Billeruds Aktiebolag. Bleaching cellulose pulp with oxygen in the presence of formaldehyde. 4,004,967, Cl. 162-65.000.

Swanson, Rune: *See—*
Nilsson, Jan; and Swanson, Rune, 4,005,319.

Sweeny, Charles D., to American Color & Chemical Corporation. Method for treating effluent resulting from the manufacture of synthetic dyestuffs and related intermediate chemicals. 4,005,011, Cl. 210-18.000.

Swiss Aluminium Ltd.: *See—*
Wagner, Alfred; and Kidratschky, Hermann, 4,005,255.

Sycor, Inc.: *See—*
Morgan, Samuel A., 4,005,493.

Sylvest, Karl Jens, to F. L. Smidth & Co. Method of burning pulverous raw material and rotary kiln plant therefor. 4,004,876, Cl. 432-14.000.

Syntex (U.S.A.) Inc.: *See—*
Beard, Colin C.; Edwards, John A.; and Fried, John H., 4,005,202.

Szendroi, Imre, to Bethlehem Steel Corporation. Coke oven larry car coal restricting insert. 4,004,702, Cl. 214-35.00R.

Szente, Andre: *See—*
Hellerbach, Joseph; and Szente, Andre, 4,005,085.

Szilva, Andras, to Apritogepgyar. Adjustable boring bar provided with hard metal shifting tip for metal working. 4,004,858, Cl. 408-153.000.

T.A.D. Avanti, Inc.: *See—*
Darwood, James R., 4,005,270.

Tada, Masahiro: *See—*
Hongu, Masayuki; and Tada, Masahiro, 4,005,371.

Taguchi, Tetsuya: *See—*
Uchiyama, Takashi; Mashimo, Yukio; Taguchi, Tetsuya; and Nakamura, Zenzo, 4,005,444.

Takacs, Istvan: *See—*
Fabry, Gyorgy; Takacs, Istvan; and Kiszely, Gyorgy, 4,004,609.

Takahama, Takashi: *See—*
Shibayama, Kyoichi; Sato, Fumihiko; and Takahama, Takashi, 4,004,999.

Takahashi, Hiroh: *See—*
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Takahashi, Katuhiko: *See—*
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Takahashi, Teizo: *See—*
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Takahashi, Yuji: *See—*
Fukuoka, Hiroshi; Kameyama, Teruhiko; Takahashi, Yuji; Nicho, Kenji; Misawa, Tatsuo; Inoue, Tsuneyuki; and Imai, Kimiaki, 4,004,918.

Takano, Teruhisa: *See—*
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Takashima, Akira: *See—*
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Takasuga, Yutaka; Nishimura, Seiichiro; and Suzuki, Masayoshi, to Bridgestone Tire Company Limited. Stitching apparatus for stitching tire components on a building drum. 4,004,961, Cl. 156-421.000.

Takaya, Yoshikazu: *See—*
Miyazawa, Sadayuki; and Takaya, Yoshikazu, 4,004,928.

Takeda Chemical Industries, Ltd.: *See—*
Yurugi, Shojiro; and Kikuchi, Shintaro, 4,005,201.

Talbert, Sherwood G.: *See—*
Frieling, Donald H.; Talbert, Sherwood G.; and Nathan, Richard A., 4,004,573.

Talley, James C.: *See—*
Potteiger, Lester A.; Soper, William G.; and Talley, James C., 4,004,518.

Tamura, Yukio; Tanaka, Yoshikazu; Kuroiwa, Satoshi; and Suzuki, Mikiji, to Toyota Jidosha Kogyo Kabushiki Kaisha. Method and apparatus for judging quality of spot weld. 4,005,307, Cl. 219-109.000.

Tanaka, Akio, to Zenith Radio Corporation. Memory tuning system with automatic two speed display. 4,005,368, Cl. 325-455.000.

Tanaka, Shunji: *See—*
Araseki, Takashi; Ochiai, Kazuo; Ogihara, Takashi; and Tanaka, Shunji, 4,005,277.

Tanaka, Yoshikazu: *See—*
Tamura, Yukio; Tanaka, Yoshikazu; Kuroiwa, Satoshi; and Suzuki, Mikiji, 4,005,307.

Tang, Henry Y. S.: *See—*
Happer, William; and Tang, Henry Y. S., 4,005,355.

Tangorra, Giorgio; and Calori, Giovanni, to Industrie Pirelli S.p.A. Pneumatic wheel for motor vehicles. 4,004,628, Cl. 152-383.000.

Tanimura, Shigeru; Miura, Nobuaki; and Miyamoto, Mikizo, to Omron Tateisi Electronics Co. Semiconductor photoelectric device with plural tin oxide heterojunctions and common electrical connection. 4,005,468, Cl. 357-15.000.

Tankersley, Robert Walker, Jr., to A. H. Robins Company, Incorporated. Method of combating influenza type A and B and parainfluenza type 3 viruses with aminospiranes and aminoalkylspiranes. 4,005,224, Cl. 424-325.000.

Tanno, Norihiko: *See—*
Yamada, Hirotada; Tobiki, Hisao; Nakatsuka, Iwao; Tanno, Norihiko; Shimago, Kozo; and Nakagome, Takenari, 4,005,075.

Taub, David: *See—*
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Taubert, Friedrich C.: *See—*
Groenendaal, Willem; Taubert, Friedrich C.; Naber, Jaap E.; and Bekker, Gijsbertus A., 4,004,885.

Taylor, George W.; and Zinn, Mortimer H., to United States of America, Army. Multiple electron beam analog to digital converter. 4,005,408, Cl. 340-347.00P.

Taylor, William T. Overshot. 4,004,835, Cl. 294-86.290.

Tazawa, Shunsuke; and Okabe, Kazuo, to Nitto Chemical Industry Co., Ltd. Process for stabilizing soil. 4,004,428, Cl. 61-36.00C.

Technicon Instruments Corporation: *See—*
Burns, Donald A., 4,004,451.

Techniservice Division Textured Yarn Co., Inc.: *See—*
Stanley, Robert K., 4,004,330.

Tecnik International Corporation: *See—*
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Telefonaktiebolaget L M Ericsson: *See—*
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TELETTRA-Laboratori di Telefonia Elettronica e Radio S.p.A.: *See—*
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Teleweld, Inc.: *See—*
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Tenneco Inc.: *See—*
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Termiflex Corporation: *See—*
Morley, Richard E.; and Schwenk, George G., 4,005,388.

Teulon, Jean-Marie, to Societe Anonyme dite: Hexachimie. Pyrrolidine derivatives. 4,005,103, Cl. 260-326.5CA.

Texaco Inc.: *See—*
Brown, Alfred; Wu, Ching H.; and Konopnicki, Daniel T., 4,004,636.
Mott, George E., 4,004,531.

Texas Instruments Incorporated: *See—*
Boulanger, Henry J., 4,005,293.
Claiborne, Lewis T., Jr., 4,005,318.
Keough, Laurence J., 4,005,299.
Soobik, Lembit, 4,005,404.

Thackery, Russell H. Power tool. 4,004,623, Cl. 144-193.00R.

Theriot, Gerald F., to B.W.B. Controls, Inc. Line control. 4,004,610, Cl. 137-614.170.

Thermo-Kinetics, Inc.: *See—*
Wyman, Floyd H.; and Chambers, John E., 4,005,018.

Thiele, Willi: *See—*
Wochnowski, Waldemar; Thiele, Willi; Hohm, Reinhard; and Schmidt, Herbert, 4,004,594.

Thieme, Klaus-Dietrich, to Licentia Patent-Verwaltungs-G.m.b.H. Ignition system. 4,004,561, Cl. 123-148.0CB.

Thijssen, Henricus A. C.; and Huige, Nicolaas J. J., to Stamicarbon B.V. Two stage continuous process and apparatus for crystallization. 4,004,886, Cl. 23-273.00F.

Thivellier, Daniel; Seraphin, Leon; and Tricot, Roland, to Ugine Aciers. Free machining steel. 4,004,922, Cl. 75-123.0AA.

Thomas, Daniel: *See—*
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Thomas, Herbert: *See—*
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Thomas, Louis R., Jr.: *See—*
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Thomas, William D.; and Boltz, Chadwick C., to Walter Kidde & Company, Inc. Pneumatic customer terminal for drive-up banking installations. 4,004,753, Cl. 243-19.000.

Thompson, Barrie Arthur: *See—*
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Thompson, Garth Molesdale: *See—*
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Thomson-CSF: *See—*
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Vergnolle, Claude, 4,005,467.

Thourel, Leo Y., to Agence Nationale de Valorisation de la Recherche (ANVAR). Microwave heat treating furnace. 4,005,301, Cl. 219-10.55A.

Thuruoka, Hisashi: *See—*
Fujiwara, Hideo; Ichinose, Yukio; Ichino, Kazuo; Orita, Isamu; Uesaka, Yasutaro; Itoh, Michiya; and Thuruoka, Hisashi, 4,005,396.

Thyrum, Per T. Method for detecting oil in water. 4,004,453, Cl. 73-61.10R.

Tibbits, Richard Paul, to Raymond Lee Organization, Inc., The, a part interest. Automotive trailer light adapter. 4,005,313, Cl. 307-10.00R.

Tilly, Guy; Hardouin, Michel Jean Charles; and Lautrou, Jean, to Laboratoires Andre Guerbet. X-ray contrast media. 4,005,188, Cl. 424-5.000.

Timken Company, The: *See—*
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Tioxide Group Limited: *See—*
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Titovi Zavodi Litostroj Ljubljana n.sol.o.: *See—*
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Tobiki, Hisao: *See—*
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Toda, Toshimasa: *See—*
Murayama, Keisuku; Moriyama, Syoji; Yoshioka, Takao; Toda, Toshimasa; Mori, Eiko; Horiuchi, Hideo; Higashida, Susumu; Matsui, Katsuaki; Kurumada, Tomoyuki; Ohata, Noriyuki; and Ohsawa, Hisayou, 4,005,094.

Todd, James M., to Reigning Spirit of Truth. Christian door knocker. 4,004,547, Cl. 116-148.000.

Toepfl, Werner, to Ciba-Geigy AG. Thiolcarbamates for combating undesired plant growth. 4,004,914, Cl. 71-100.000.

Tokuyama, Takeshi: *See—*
Yoshida, Isao; Tokuyama, Takeshi; Nishimatsu, Shigeru; and Ikeda, Takahide, 4,005,450.

Tomelleri, Giordano. Artichoke shaping machine. 4,004,502, Cl. 99-593.000.

Tomlinson, John H., to United Technologies Corporation. Switching transient suppression circuit. 4,005,316, Cl. 307-247.00A.

Tonseth, Ivar Scott, Jr.: *See—*
Dix, Joseph; Campbell, Norman; and Tonseth, Ivar Scott, Jr., 4,004,490.

Toray Industries, Inc.: *See—*
Akatsuka, Takeaki; Kato, Akinori; Kojima, Teiryo; Inaba, Sinji; and Higashino, Kohichi, 4,005,392.
Suzuki, Hirotsugu; Ogawa, Yo; Kikuchi, Yoshikazu; and Kitazawa, Shin-ichi, 4,004,406.

Touyama, Yoshikuni: *See—*
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Tovar, Theodor: *See—*
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Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
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Trcka, Vaclav: *See—*
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Trebron Holdings Limited: *See—*
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Tropea, David H.: *See—*
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Tyler, Roger K.; and Andrews, James D., 4,004,992.
Tshudy, Donald Richard; and Edwards, Thomas William, to RCA Corporation. Method of selective growth of microcrystalline silicon. 4,004,954, Cl. 148-174.000.
Tsuchimochi, Yoshihisa: *See—*
Mabuchi, Kenichi; and Tsuchimochi, Yoshihisa, 4,005,320.
Tsuda, George I., to Hughes Aircraft Company. Small wavelength high efficiency antenna. 4,005,433, Cl. 343-819.000.
Tsuji, Naotaka; and Yamada, Koji, to Bridgestone Tire Company Limited. Apparatus for inspecting the disposition of steel ply cords in pneumatic tires. 4,004,693, Cl. 209-81.00R.
Tsukamoto, Kenkichi; Matsumura, Yusuke; and Sano, Ryuichi, to Shimada, Seiko; Takahashi, Teizo; and Nishida, Mitso. Process of curing a polymerizable composition containing a magnetized powered ferromagnetic material with radioactive rays. 4,004,997, Cl. 204-159.140.
Tucci, Patrick A.; and Russell, Lewis K., to Signetics Corporation. Triple diffused logic elements. 4,005,470, Cl. 357-36.000.
Tucker, Terry Allen; and Rice, Jeffrey Clarus, to Sperry Rand Corporation. Apparatus for processing radar video signals. 4,005,416, Cl. 343-5.0VQ.
Tully, Paul Raymond, to Cabot Corporation. Agricultural soil compositions. 4,004,368, Cl. 47-58.000.
Tunc, Deger C., to Johnson & Johnson. Process for preparation of alkali cellulose ester sulfates. 4,005,251, Cl. 536-59.000.
Tung, Chi Fang, to Minnesota Mining and Manufacturing Company. Fluid composition for forming retroreflective structures. 4,004,930, Cl. 106-19.000.
Tung, Pham Ngu, to Thomson-CSF. Method of manufacturing field-effect transistors designed for operation at very high frequencies, using integrated techniques. 4,004,341, Cl. 29-571.000.
Turczanki, Henry: *See—*
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Turek, James A., to Panduit Corporation. Cable tie braking means in a cable tie installation tool. 4,004,618, Cl. 140-93.200.
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Tyler, Michael N.: *See—*
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Tyler, Roger K.; and Andrews, James D., to TRW Inc. Power supply for electrochemical machining. 4,004,992, Cl. 204-129.550.
Tyler, Wesley R.: *See—*
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Uchida, Azusa: *See—*
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Uchiyama, Takashi; Mashimo, Yukio; Taguchi, Tetsuya; and Nakamura, Zenzo, to Canon Kabushiki Kaisha. Exposure control system for flash photography. 4,005,444, Cl. 354-27.000.
Ueda, Kazuo: *See—*
Gerstine, Milton I.; Goldberg, Joshua I.; Futatsugi, Setsuo; Ueda, Kazuo; Seo, Ryozo; Iwasaki, Koji; and Uemura, Makoto, 4,004,756.
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Ueno, Zene; and Nagaoka, Tadahiko, to Nissan Motor Co., Ltd. Combustible mixture supply system. 4,004,413, Cl. 60-39.46M.
Ueno, Zene: *See—*
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Urayama, Yuji, to Victor Company of Japan, Limited. Automatic telephone answering and recording apparatus. 4,005,271, Cl. 179-6.00R.

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Vahaviolos, Sotirios John, to Western Electric Company, Inc. Method and apparatus for the real-time, non-destructive evaluation of adhesion bonds using stress-wave emission techniques. 4,004,456, Cl. 73-71.400.

Vaitys, Ramojus P., to United States of America, Air Force. Overload clutch with zero parasitic torque. 4,004,667, Cl. 192-56.00R.

Valentine, Charles G., to Xerox Corporation. Educational device for learning automotive trouble-shooting. 4,004,353, Cl. 35-13.000.

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van Os, Adriaan Gabriel, to Stichting Speurwerk Baggertechniek. Method and apparatus for dredging of ground, particularly sand. 4,004,358, Cl. 37-63.000.

Varian Associates: *See—*
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Vepa AG: *See—*
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Walker, Walter P.; Smith, Leary W.; Cofer, Frank H., Jr.; and Lewis, Jack E., to Audichron Company, The. Dampened transducer support apparatus for message announcing system. 4,005,491, Cl. 360-105.000.

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Washizuka, Isamu; and Nakagawa, Hirohide, to Sharp Kabushiki Kaisha. Information storage and frequency converter for liquid crystal display. 4,005,403, Cl. 340-336.000.

Watanabe, Akinori; and Ando, Takao, to Electroprint, Inc. Method and apparatus for preventing ink smears in an electrostatic ink mist printing system. 4,004,513, Cl. 101-426.000.

Watanabe, Katsumi, to Yugen Kaisha Watanabe Kenkyusho. Miniature toy sound-reproducing device. 4,004,815, Cl. 274-1.00A.

Watanabe, Tsuguhiko. Method and device for anchoring a strut. 4,004,383, Cl. 52-154.000.

Watanabe, Yukiyasu: *See—*
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Wataya, Masataka; Onodera, Nobuo; and Imamura, Shosuke, to Hodogaya Chemical Co., Ltd. Process for producing polyhalogenated phenols. 4,005,151, Cl. 260-623.00R.

Watrous, Willis George, Jr.; and Jenkins, Robert T., to Intel Corporation. Corrosive resistant semiconductor interconnect pad. 4,005,455, Cl. 357-71.000.

Watt, David M., Jr.: *See—*
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Webb, William R., to United States of America, Navy. Synthetic aperture radar utilizing a low-speed analog-to-digital converter. 4,005,423, Cl. 343-17.2PC.

Weber, Kurt, to Rieter Machine Works, Ltd. Transport cart. 4,004,820, Cl. 280-103.000.

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Weidenbach, Guenther; Koepernik, Karl Hermann; and Braeutigam, Hans, to Kali-Chemie Aktiengesellschaft. Catalytic treatment of automotive exhaust gas. 4,005,177, Cl. 423-213.500.

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Weman, Per Olaf; and Schmelow, Harald Martin, to Sigmatex, A.G. Safety belt inertia retractor and backing device. 4,004,751, Cl. 242-107.40A.

Wember, Kurt: *See—*
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Wendler, Norman L.; Taub, David; Slates, Harry L.; and Zelawski, Zbigniew S., to Merck & Co., Inc. 3β-[(Methoxalyl)oxy]-2α-(3-oxo-1-octenyl)-5-oxo-1β-cyclopentaneheptanoic acid and process. 4,005,106, Cl. 260-340.900.

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Wesley, Frank, to Societe d'Assistance Technique pour Produits Nestle S.A. Syringes. 4,004,718, Cl. 222-386.000.

Wesseler, Gerhard, to Dula-Werke Dustmann & Co. Scaffold subassembly. 4,004,856, Cl. 403-186.000.

Wesson, Harry J. Marine implement. 4,004,539, Cl. 114-221.00R.

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West, Joseph Thomas, to Data General Corporation. Error detection and correction in data processing systems. 4,005,405, Cl. 340-146.1AL.

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Western Gear Corporation: *See—*
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Westran Corporation: *See—*
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White, Ronald D.; and Gibson, John F. Apparatus for preparing microscope slides. 4,004,550, Cl. 118-314.000.

White, Warren D., to Cutler-Hammer, Inc. Signal processing method and apparatus. 4,005,426, Cl. 343-100.0LE.

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Whitfill, William A., Jr.; and McNerney, Richard P., to Schlumberger Technology Corporation. Method for making a gas blocked logging cable. 4,005,168, Cl. 264-103.000.

Whitson, Walter J.; Laponsky, Alfred B.; and Malanoski, Raymond J., to Westinghouse Electric Corporation. Method of providing a silicon diode array target with improved beam acceptance and lag characteristic. 4,004,842, Cl. 316-1.000.

Widdig, Arno: *See—*
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Widmer, Erich, to Hoffmann-La Roche Inc. Process for the manufacturing of oxo compounds. 4,005,145, Cl. 260-586.00R.

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Wiebe, Donald; and Wagner, John H., to A. Stucki Company. Fluid truck snubber. 4,004,525, Cl. 105-197.0DH.

Wieck, Karl, to Supfina Maschinenfabrik Hentzen KG. Apparatus for continuous cleaning of a honing tool. 4,004,375, Cl. 51-59.0SS.

Wier, Donald R.: *See—*
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Wihksne, Allen, to Arbrook, Inc. Glove package box with interchangeable identification. 4,004,691, Cl. 206-459.000.

Wikey, Arnold. Water treatment system with prolonged aeration. 4,005,014, Cl. 210-192.000.

Wilbur, Robert Daniel: *See—*
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Wilcox, Clinton L., to United States of America, Army. Beacon side lobe detector. 4,005,419, Cl. 343-7.400.

Wildt Mellor Bromley Limited of Adelaide Works: *See—*
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Wilhelmsson, Bertil Lennart: *See—*
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Willems, Jozef Frans; and Janssens, Wilhelmus, to AGFA-GEVAERT N.V. Formation of azine dyes. 4,004,926, Cl. 96-66.00R.

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CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 48,560	4,002,772	Mar. 30, 1976	Jan. 11, 1977
B 54,859	4,000,101	Feb. 17, 1976	Dec. 28, 1976
B 59,512	3,999,216	Mar. 16, 1976	Dec. 21, 1976
B 73,017	4,001,879	Mar. 9, 1976	Jan. 4, 1977
B 78,315	3,982,192	Feb. 10, 1976	Sep. 21, 1976
B 79,099	3,982,177	Jan. 13, 1976	Sep. 21, 1976
B 97,259	3,999,614	Mar. 9, 1976	Dec. 28, 1976
B 111,130	4,001,380	Mar. 16, 1976	Jan. 4, 1977
B 150,142	3,981,767	Jan. 27, 1976	Sep. 21, 1976
B 160,045	3,983,446	Jan. 13, 1976	Sep. 28, 1976
B 160,099	3,987,221	Jan. 13, 1976	Oct. 19, 1976
B 163,463	3,981,659	Jan. 27, 1976	Sep. 21, 1976
B 167,470	4,001,101	Mar. 2, 1976	Jan. 4, 1977
B 181,208	4,001,391	Mar. 9, 1976	Jan. 4, 1977
B 200,759	3,986,872	Feb. 3, 1976	Oct. 19, 1976
B 208,916	3,987,106	Jan. 13, 1976	Oct. 19, 1976
B 214,925	3,997,648	Mar. 9, 1976	Dec. 14, 1976
B 223,678	3,989,159	Mar. 9, 1976	Nov. 2, 1976
B 231,416	4,000,054	Mar. 30, 1976	Dec. 28, 1976
B 236,342	4,001,182	Feb. 10, 1976	Jan. 4, 1977
B 248,240	3,983,556	Jan. 13, 1976	Sep. 28, 1976
B 257,143	4,000,111	Mar. 16, 1976	Dec. 28, 1976
B 270,274	3,982,223	Feb. 17, 1976	Sep. 21, 1976
B 270,351	3,997,893	Mar. 30, 1976	Dec. 14, 1976
B 271,743	4,001,195	Mar. 16, 1976	Jan. 4, 1977
B 276,026	3,992,405	Feb. 3, 1976	Nov. 16, 1976
B 279,415	4,000,697	Mar. 16, 1976	Jan. 4, 1977
B 279,969	3,986,073	Jan. 13, 1976	Oct. 12, 1976
B 283,941	3,995,313	Feb. 3, 1976	Nov. 30, 1976
B 288,757	4,001,072	Mar. 30, 1976	Jan. 4, 1977
B 301,143	3,991,107	Jan. 27, 1976	Nov. 9, 1976
B 302,160	3,985,774	Feb. 3, 1976	Oct. 12, 1976
B 306,668	3,985,713	Feb. 3, 1976	Oct. 12, 1976
B 307,698	3,993,763	Feb. 3, 1976	Nov. 23, 1976
B 308,659	3,981,947	Jan. 27, 1976	Sep. 21, 1976
B 311,450	3,988,976	Mar. 9, 1976	Nov. 2, 1976
B 313,280	4,003,591	Apr. 6, 1976	Jan. 18, 1977
B 326,211	3,988,272	Mar. 23, 1976	Oct. 26, 1976
B 328,116	4,000,774	Mar. 9, 1976	Jan. 4, 1977
B 330,719	4,001,121	Mar. 16, 1976	Jan. 4, 1977
B 330,736	3,996,299	Feb. 3, 1976	Dec. 7, 1976
B 332,442	4,001,231	Mar. 30, 1976	Jan. 4, 1977
B 333,110	3,989,867	Mar. 16, 1976	Nov. 2, 1976
B 333,247	4,001,201	Mar. 16, 1976	Jan. 4, 1977
B 336,754	3,989,805	Mar. 16, 1976	Nov. 2, 1976
B 337,823	4,002,746	Mar. 23, 1976	Jan. 11, 1977
B 339,194	3,982,215	Feb. 3, 1976	Sep. 21, 1976
B 339,446	4,001,067	Feb. 24, 1976	Jan. 4, 1977
B 340,170	4,000,444	Mar. 30, 1976	Dec. 28, 1976
B 347,661	3,999,218	Mar. 16, 1976	Dec. 21, 1976
B 348,433	3,984,405	Feb. 3, 1976	Oct. 5, 1976
B 349,370	3,989,684	Jan. 27, 1976	Nov. 2, 1976
B 351,455	4,001,309	Feb. 24, 1976	Jan. 4, 1977
B 354,959	3,995,996	Feb. 17, 1976	Dec. 7, 1976
B 356,187	3,981,222	Jan. 20, 1976	Sep. 21, 1976
B 357,526	4,001,319	Mar. 23, 1976	Jan. 4, 1977
B 358,260	3,989,661	Mar. 30, 1976	Nov. 2, 1976
B 358,427	3,989,896	Feb. 3, 1976	Nov. 2, 1976
B 359,901	3,981,729	Jan. 13, 1976	Sep. 21, 1976
B 363,565	4,004,821	Mar. 30, 1976	Jan. 25, 1977
B 364,797	3,996,131	Feb. 17, 1976	Dec. 7, 1976
B 367,305	3,998,640	Mar. 2, 1976	Dec. 21, 1976
B 367,621	3,989,589	Feb. 3, 1976	Nov. 2, 1976
B 369,221	3,985,834	Feb. 24, 1976	Oct. 12, 1976
B 370,309	3,989,640	Jan. 20, 1976	Nov. 2, 1976
B 371,095	4,005,074	Mar. 23, 1976	Jan. 25, 1977
B 371,912	3,995,738	Mar. 2, 1976	Dec. 7, 1976
B 372,016	3,989,685	Mar. 9, 1976	Nov. 2, 1976
B 372,232	4,000,967	Mar. 16, 1976	Jan. 4, 1977
B 372,722	3,998,925	Mar. 9, 1976	Dec. 21, 1976
B 373,354	3,989,870	Jan. 27, 1976	Nov. 2, 1976
B 374,588	3,985,899	Jan. 27, 1976	Oct. 12, 1976
B 378,513	3,981,750	Jan. 27, 1976	Sep. 21, 1976
B 378,760	4,001,477	Mar. 9, 1976	Jan. 4, 1977
B 379,177	3,981,976	Jan. 27, 1976	Sep. 21, 1976
B 381,709	3,984,587	Jan. 13, 1976	Oct. 5, 1976
B 381,985	3,990,775	Feb. 3, 1976	Nov. 9, 1976
B 384,225	3,998,523	Mar. 16, 1976	Dec. 21, 1976
B 384,320	3,985,613	Jan. 27, 1976	Oct. 12, 1976
B 384,654	3,992,681	Feb. 24, 1976	Nov. 16, 1976
B 385,024	3,994,911	Feb. 10, 1976	Nov. 30, 1976
B 385,483	3,993,684	Feb. 17, 1976	Nov. 23, 1976
B 385,631	3,982,924	Jan. 27, 1976	Sep. 28, 1976
B 386,257	3,981,915	Feb. 3, 1976	Sep. 21, 1976
B 386,673	3,993,717	Feb. 3, 1976	Nov. 23, 1976
B 386,828	3,992,440	Feb. 3, 1976	Nov. 16, 1976
B 387,337	D 243,157	Mar. 16, 1976	Jan. 25, 1977
B 389,155	4,000,970	Mar. 30, 1976	Jan. 4, 1977
B 389,304	3,986,829	Jan. 27, 1976	Oct. 19, 1976
B 390,031	3,985,799	Jan. 13, 1976	Oct. 12, 1976
B 390,408	3,992,426	Feb. 3, 1976	Nov. 16, 1976
B 390,979	4,003,850	Mar. 23, 1976	Jan. 18, 1977
B 391,473	3,988,370	Mar. 2, 1976	Oct. 26, 1976
B 391,797	3,988,046	Mar. 9, 1976	Oct. 26, 1976
B 391,844	3,999,165	Mar. 16, 1976	Dec. 21, 1976
B 392,798	3,996,249	Mar. 30, 1976	Dec. 7, 1976
B 394,248	3,989,764	Jan. 27, 1976	Nov. 2, 1976
B 394,350	3,982,200	Jan. 13, 1976	Sep. 21, 1976
B 395,554	3,998,156	Mar. 9, 1976	Dec. 21, 1976
B 395,975	4,001,085	Mar. 2, 1976	Jan. 4, 1977
B 396,164	3,989,590	Feb. 3, 1976	Nov. 2, 1976
B 396,377	D 243,148	Apr. 6, 1976	Jan. 25, 1977
B 397,674	3,998,438	Mar. 16, 1976	Dec. 21, 1976
B 398,084	3,996,239	Feb. 3, 1976	Dec. 7, 1976
B 398,220	3,990,834	Feb. 3, 1976	Nov. 9, 1976
B 398,488	3,987,991	Feb. 24, 1976	Oct. 26, 1976
B 399,098	3,997,665	Feb. 24, 1976	Dec. 14, 1976
B 399,632	4,001,046	Mar. 9, 1976	Jan. 4, 1977
B 399,908	3,983,323	Jan. 13, 1976	Sep. 28, 1976
B 400,871	3,988,893	Feb. 17, 1976	Nov. 2, 1976
B 401,042	D 242,197	Mar. 16, 1976	Nov. 9, 1976
B 402,162	3,994,902	Mar. 2, 1976	Nov. 30, 1976
B 402,328	3,995,545	Apr. 6, 1976	Dec. 7, 1976
B 402,553	3,983,219	Feb. 17, 1976	Sep. 28, 1976
B 402,929	3,991,251	Feb. 3, 1976	Nov. 9, 1976
B 403,243	3,996,232	Mar. 30, 1976	Dec. 7, 1976
B 403,326	4,001,212	Mar. 23, 1976	Jan. 4, 1977
B 403,477	3,995,315	Feb. 3, 1976	Nov. 30, 1976
B 403,507	3,982,095	Feb. 10, 1976	Sep. 21, 1976
B 403,766	3,994,834	Feb. 10, 1976	Nov. 30, 1976
B 403,883	4,001,481	Mar. 23, 1976	Jan. 4, 1977
B 405,726	3,981,241	Jan. 13, 1976	Sep. 21, 1976
B 406,546	D 242,966	Mar. 16, 1976	Jan. 11, 1977
B 407,205	4,000,966	Mar. 16, 1976	Jan. 4, 1977
B 407,737	3,992,546	Feb. 3, 1976	Nov. 16, 1976
B 409,848	3,983,270	Jan. 27, 1976	Sep. 28, 1976
B 410,074	4,001,303	Feb. 24, 1976	Jan. 4, 1977
B 410,694	3,995,530	Mar. 23, 1976	Dec. 7, 1976
B 411,471	3,982,933	Feb. 17, 1976	Sep. 28, 1976
B 411,624	4,001,205	Mar. 16, 1976	Jan. 4, 1977
B 411,765	3,993,428	Feb. 24, 1976	Nov. 23, 1976
B 412,068	3,981,244	Jan. 13, 1976	Sep. 21, 1976
B 413,379	4,001,325	Mar. 9, 1976	Jan. 4, 1977
B 414,028	3,993,738	Feb. 17, 1976	Nov. 23, 1976
B 414,266	3,993,614	Feb. 10, 1976	Nov. 23, 1976
B 414,481	3,982,979	Jan. 20, 1976	Sep. 28, 1976
B 414,971	D 242,208	Feb. 10, 1976	Nov. 9, 1976
B 415,021	3,994,173	Mar. 2, 1976	Nov. 30, 1976
B 415,122	3,997,503	Feb. 10, 1976	Dec. 14, 1976
B 416,257	4,001,335	Mar. 16, 1976	Jan. 4, 1977
B 416,589	3,990,363	Jan. 27, 1976	Nov. 9, 1976
B 417,014	3,981,851	Jan. 13, 1976	Sep. 21, 1976
B 417,164	4,001,360	Mar. 2, 1976	Jan. 4, 1977
B 417,349	3,985,076	Mar. 9, 1976	Oct. 12, 1976
B 418,489	3,989,592	Jan. 13, 1976	Nov. 2, 1976
B 419,173	3,999,728	Mar. 9, 1976	Dec. 28, 1976
B 419,582	3,989,681	Mar. 2, 1976	Nov. 2, 1976
B 420,176	4,001,017	Mar. 16, 1976	Jan. 4, 1977
B 420,321	3,990,645	Mar. 30, 1976	Nov. 9, 1976
B 420,472	3,993,934	Feb. 24, 1976	Nov. 23, 1976
B 421,373	4,001,326	Mar. 23, 1976	Jan. 4, 1977
B 421,975	3,994,693	Mar. 2, 1976	Nov. 30, 1976
B 422,063	3,994,835	Feb. 3, 1976	Nov. 30, 1976
B 423,365	3,996,186	Feb. 17, 1976	Dec. 7, 1976
B 423,404	3,990,958	Mar. 2, 1976	Nov. 9, 1976
B 423,441	3,997,137	Feb. 17, 1976	Dec. 14, 1976
B 423,867	3,990,844	Feb. 3, 1976	Nov. 9, 1976
B 423,883	3,986,871	Jan. 27, 1976	Oct. 19, 1976
B 424,354	D 242,416	Feb. 10, 1976	Nov. 23, 1976
B 424,989	3,990,569	Feb. 3, 1976	Nov. 9, 1976
B 425,193	4,002,107	Mar. 23, 1976	Jan. 11, 1977
B 425,462	3,998,396	Mar. 9, 1976	Dec. 21, 1976
B 425,588	3,985,111	Jan. 13, 1976	Oct. 12, 1976
B 426,227	3,999,028	Mar. 2, 1976	Dec. 21, 1976
B 426,266	3,998,839	Mar. 2, 1976	Dec. 21, 1976
B 426,424	3,993,742	Feb. 3, 1976	Nov. 23, 1976
B 426,639	3,992,539	Feb. 3, 1976	Nov. 16, 1976
B 426,819	3,995,868	Feb. 17, 1976	Dec. 7, 1976
B 427,883	3,982,277	Jan. 20, 1976	Sep. 21, 1976
B 428,103	4,000,211	Feb. 10, 1976	Dec. 28, 1976
B 428,271	3,987,415	Mar. 23, 1976	Oct. 19, 1976
B 428,408	3,995,252	Mar. 2, 1976	Nov. 30, 1976
B 428,877	3,984,649	Jan. 27, 1976	Oct. 5, 1976
B 429,018	3,990,061	Feb. 10, 1976	Nov. 2, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 429,027	4,001,260	Mar. 23, 1976	Jan. 4, 1977
B 429,157	3,990,628	Jan. 27, 1976	Nov. 9, 1976
B 429,434	3,989,223	Feb. 17, 1976	Nov. 2, 1976
B 430,157	3,992,465	Feb. 17, 1976	Nov. 16, 1976
B 430,172	3,982,563	Jan. 13, 1976	Sep. 28, 1976
B 430,276	3,982,171	Jan. 20, 1976	Sep. 21, 1976
B 430,287	D 242,489	Feb. 10, 1976	Nov. 23, 1976
B 430,326	4,003,581	Mar. 23, 1976	Jan. 18, 1977
B 430,334	3,981,677	Jan. 27, 1976	Sep. 21, 1976
B 431,072	3,985,610	Jan. 20, 1976	Oct. 12, 1976
B 431,334	3,988,095	Mar. 16, 1976	Oct. 26, 1976
B 431,713	4,000,167	Feb. 10, 1976	Dec. 28, 1976
B 431,785	3,999,950	Feb. 24, 1976	Dec. 28, 1976
B 432,049	3,995,123	Mar. 23, 1976	Nov. 30, 1976
B 432,140	3,999,163	Mar. 23, 1976	Dec. 21, 1976
B 432,594	4,003,404	Mar. 30, 1976	Jan. 18, 1977
B 432,969	3,997,017	Mar. 2, 1976	Dec. 14, 1976
B 432,991	3,991,669	Mar. 2, 1976	Nov. 16, 1976
B 433,094	3,987,768	Jan. 27, 1976	Oct. 26, 1976
B 434,206	3,994,610	Feb. 3, 1976	Nov. 30, 1976
B 434,441	D 242,849	Mar. 16, 1976	Dec. 28, 1976
B 435,481	4,000,892	Mar. 9, 1976	Jan. 4, 1977
B 435,570	4,000,908	Mar. 16, 1976	Jan. 4, 1977
B 435,617	4,001,234	Mar. 16, 1976	Jan. 4, 1977
B 436,724	3,991,856	Feb. 24, 1976	Nov. 16, 1976
B 437,209	4,001,193	Feb. 3, 1976	Jan. 4, 1977
B 437,559	3,993,287	Feb. 3, 1976	Nov. 23, 1976
B 437,596	3,985,638	Jan. 27, 1976	Oct. 12, 1976
B 437,894	4,001,015	Mar. 2, 1976	Jan. 4, 1977
B 438,048	4,001,394	Mar. 23, 1976	Jan. 4, 1977
B 438,484	3,992,451	Feb. 17, 1976	Nov. 16, 1976
B 438,882	3,983,719	Feb. 24, 1976	Oct. 5, 1976
B 438,916	3,983,050	Jan. 13, 1976	Sep. 28, 1976
B 439,542	3,982,199	Jan. 27, 1976	Sep. 21, 1976
B 439,778	4,001,455	Feb. 3, 1976	Jan. 4, 1977
B 440,548	4,001,271	Mar. 16, 1976	Jan. 4, 1977
B 440,633	4,000,116	Feb. 10, 1976	Dec. 28, 1976
B 440,858	3,993,670	Feb. 3, 1976	Nov. 23, 1976
B 441,723	3,988,249	Mar. 16, 1976	Oct. 26, 1976
B 441,789	4,001,449	Mar. 30, 1976	Jan. 4, 1977
B 442,163	D 242,192	Mar. 16, 1976	Nov. 9, 1976
B 442,295	4,000,477	Mar. 16, 1976	Dec. 28, 1976
B 442,810	3,997,533	Feb. 24, 1976	Dec. 14, 1976
B 442,866	3,982,351	Feb. 24, 1976	Sep. 28, 1976
B 442,953	4,002,657	Mar. 23, 1976	Jan. 11, 1977
B 442,970	3,989,890	Feb. 3, 1976	Nov. 2, 1976
B 443,163	3,981,242	Feb. 3, 1976	Sep. 21, 1976
B 443,446	D 242,494	Apr. 6, 1976	Nov. 23, 1976
B 443,563	3,996,204	Feb. 24, 1976	Dec. 7, 1976
B 443,647	3,990,737	Feb. 17, 1976	Nov. 9, 1976
B 443,712	3,982,233	Jan. 27, 1976	Sep. 21, 1976
B 444,437	3,995,171	Mar. 9, 1976	Nov. 30, 1976
B 445,166	4,001,252	Mar. 2, 1976	Jan. 4, 1977
B 445,459	3,988,889	Feb. 3, 1976	Nov. 2, 1976
B 445,493	3,994,903	Mar. 2, 1976	Nov. 30, 1976
B 445,690	3,999,584	Feb. 3, 1976	Dec. 28, 1976
B 446,107	4,001,276	Mar. 9, 1976	Jan. 4, 1977
B 447,000	3,984,419	Feb. 3, 1976	Oct. 5, 1976
B 447,440	3,991,724	Feb. 17, 1976	Nov. 16, 1976
B 449,892	3,997,919	Mar. 23, 1976	Dec. 14, 1976
B 450,196	3,997,701	Feb. 10, 1976	Dec. 14, 1976
B 450,521	3,982,838	Feb. 17, 1976	Sep. 28, 1976
B 450,701	3,991,084	Mar. 16, 1976	Nov. 9, 1976
B 450,708	3,989,724	Mar. 9, 1976	Nov. 2, 1976
B 450,870	3,998,951	Mar. 16, 1976	Dec. 21, 1976
B 450,967	3,983,055	Jan. 13, 1976	Sep. 28, 1976
B 451,248	3,997,758	Mar. 2, 1976	Dec. 14, 1976
B 451,308	3,991,037	Feb. 17, 1976	Nov. 9, 1976
B 451,396	4,000,450	Apr. 13, 1976	Dec. 28, 1976
B 451,438	Re. 29,066	Mar. 2, 1976	Dec. 7, 1976
B 451,534	3,986,033	Jan. 13, 1976	Oct. 12, 1976
B 452,034	4,002,367	Mar. 23, 1976	Jan. 11, 1977
B 452,138	4,004,278	Mar. 23, 1976	Jan. 18, 1977
B 452,501	4,001,111	Mar. 16, 1976	Jan. 4, 1977
B 452,672	3,981,602	Jan. 13, 1976	Sep. 21, 1976
B 452,879	4,001,089	Mar. 16, 1976	Jan. 4, 1977
B 452,883	3,981,735	Jan. 27, 1976	Sep. 21, 1976
B 452,938	3,994,719	Feb. 17, 1976	Nov. 30, 1976
B 453,031	3,998,678	Mar. 16, 1976	Dec. 21, 1976
B 453,067	4,005,394	Mar. 23, 1976	Jan. 25, 1977
B 453,238	3,997,063	Mar. 2, 1976	Dec. 14, 1976
B 453,432	4,000,514	Mar. 16, 1976	Dec. 28, 1976
B 453,533	3,997,744	Feb. 17, 1976	Dec. 14, 1976
B 453,616	3,987,376	Jan. 27, 1976	Oct. 19, 1976
B 453,759	3,989,790	Jan. 27, 1976	Nov. 2, 1976
B 454,283	3,995,153	Feb. 3, 1976	Nov. 30, 1976
B 455,425	3,990,060	Feb. 3, 1976	Nov. 2, 1976
B 455,481	3,991,092	Feb. 24, 1976	Nov. 9, 1976
B 455,486	4,001,353	Mar. 16, 1976	Jan. 4, 1977
B 455,686	4,001,156	Mar. 2, 1976	Jan. 4, 1977
B 455,759	3,984,242	Feb. 24, 1976	Oct. 5, 1976
B 455,806	3,998,919	Mar. 23, 1976	Dec. 21, 1976
B 456,069	3,998,991	Mar. 9, 1976	Dec. 21, 1976
B 456,148	3,984,269	Jan. 13, 1976	Oct. 5, 1976
B 456,153	3,997,992	Mar. 9, 1976	Dec. 21, 1976
B 456,579	3,993,715	Feb. 10, 1976	Nov. 23, 1976
B 456,869	4,001,277	Mar. 9, 1976	Jan. 4, 1977
B 456,900	3,996,262	Feb. 3, 1976	Dec. 7, 1976
B 457,547	3,996,397	Feb. 17, 1976	Dec. 7, 1976
B 457,850	3,993,586	Feb. 10, 1976	Nov. 23, 1976
B 457,862	3,987,195	Jan. 27, 1976	Oct. 19, 1976
B 457,886	3,988,498	Jan. 13, 1976	Oct. 26, 1976
B 457,931	4,001,229	Mar. 16, 1976	Jan. 4, 1977
B 458,500	3,997,805	Feb. 24, 1976	Dec. 14, 1976
B 458,617	3,984,422	Feb. 3, 1976	Oct. 5, 1976
B 458,964	3,996,615	Mar. 2, 1976	Dec. 7, 1976
B 459,381	4,000,017	Mar. 9, 1976	Dec. 28, 1976
B 459,597	3,996,711	Feb. 17, 1976	Dec. 14, 1976
B 459,811	3,982,173	Jan. 20, 1976	Sep. 21, 1976
B 460,388	3,989,448	Jan. 27, 1976	Nov. 2, 1976
B 460,441	3,981,828	Jan. 13, 1976	Sep. 21, 1976
B 460,846	3,985,817	Feb. 24, 1976	Oct. 12, 1976
B 461,184	3,992,482	Feb. 17, 1976	Nov. 16, 1976
B 461,250	4,000,768	Mar. 16, 1976	Jan. 4, 1977
B 461,336	3,982,231	Feb. 3, 1976	Sep. 21, 1976
B 461,352	3,981,681	Jan. 13, 1976	Sep. 21, 1976
B 461,874	3,982,276	Jan. 27, 1976	Sep. 21, 1976
B 462,386	3,988,188	Jan. 13, 1976	Oct. 26, 1976
B 462,424	3,989,602	Feb. 24, 1976	Nov. 2, 1976
B 462,828	3,998,395	Mar. 9, 1976	Dec. 21, 1976
B 462,893	3,984,253	Feb. 24, 1976	Oct. 5, 1976
B 463,322	3,989,982	Jan. 20, 1976	Nov. 2, 1976
B 463,388	3,992,605	Feb. 10, 1976	Nov. 16, 1976
B 463,473	4,002,068	Mar. 23, 1976	Jan. 11, 1977
B 463,671	3,985,385	Jan. 13, 1976	Oct. 12, 1976
B 464,027	3,999,390	Mar. 16, 1976	Dec. 28, 1976
B 464,290	3,990,307	Feb. 3, 1976	Nov. 9, 1976
B 464,587	3,991,091	Feb. 3, 1976	Nov. 9, 1976
B 464,593	3,997,659	Mar. 9, 1976	Dec. 14, 1976
B 465,145	3,981,148	Jan. 27, 1976	Sep. 21, 1976
B 465,202	3,989,757	Feb. 24, 1976	Nov. 2, 1976
B 465,393	3,987,390	Jan. 27, 1976	Oct. 19, 1976
B 465,688	3,989,770	Jan. 27, 1976	Nov. 2, 1976
B 465,955	3,997,502	Feb. 3, 1976	Dec. 14, 1976
B 466,318	3,999,115	Mar. 9, 1976	Dec. 21, 1976
B 466,390	3,983,349	Feb. 24, 1976	Sep. 28, 1976
B 466,444	3,986,039	Jan. 20, 1976	Oct. 12, 1976
B 466,906	3,993,037	Mar. 16, 1976	Nov. 23, 1976
B 466,929	3,991,195	Jan. 27, 1976	Nov. 9, 1976
B 467,250	3,997,428	Feb. 3, 1976	Dec. 14, 1976
B 467,328	3,997,599	Mar. 9, 1976	Dec. 14, 1976
B 467,412	3,981,265	Jan. 13, 1976	Sep. 21, 1976
B 467,486	3,991,725	Mar. 16, 1976	Nov. 16, 1976
B 467,971	3,983,453	Jan. 13, 1976	Sep. 28, 1976
B 468,052	3,988,335	Feb. 10, 1976	Oct. 26, 1976
B 468,100	3,995,107	Mar. 9, 1976	Nov. 30, 1976
B 468,330	4,001,475	Mar. 16, 1976	Jan. 4, 1977
B 468,350	3,981,922	Jan. 13, 1976	Sep. 21, 1976
B 468,603	4,003,839	Mar. 23, 1976	Jan. 18, 1977
B 469,468	4,000,220	Mar. 16, 1976	Dec. 28, 1976
B 469,947	3,984,153	Jan. 20, 1976	Oct. 5, 1976
B 470,170	3,986,410	Jan. 13, 1976	Oct. 19, 1976
B 470,348	3,981,929	Jan. 13, 1976	Sep. 21, 1976
B 470,576	3,997,507	Feb. 24, 1976	Dec. 14, 1976
B 470,601	3,985,655	Mar. 9, 1976	Oct. 12, 1976
B 470,798	3,987,480	Jan. 20, 1976	Oct. 19, 1976
B 470,853	4,002,101	Mar. 23, 1976	Jan. 11, 1977
B 470,899	3,996,441	Mar. 2, 1976	Dec. 7, 1976
B 470,900	4,001,213	Mar. 2, 1976	Jan. 4, 1977
B 471,116	4,001,318	Feb. 17, 1976	Jan. 4, 1977
B 471,221	3,981,974	Jan. 13, 1976	Sep. 21, 1976
B 471,405	3,993,576	Feb. 10, 1976	Nov. 23, 1976
B 471,494	3,993,660	Mar. 16, 1976	Nov. 23, 1976
B 471,579	3,985,689	Jan. 13, 1976	Oct. 12, 1976
B 471,617	3,994,871	Feb. 10, 1976	Nov. 30, 1976
B 471,735	3,989,408	Feb. 3, 1976	Nov. 2, 1976
B 471,836	4,000,150	Feb. 24, 1976	Dec. 28, 1976
B 472,241	3,992,453	Feb. 17, 1976	Nov. 16, 1976
B 472,256	3,985,789	Jan. 13, 1976	Oct. 12, 1976
B 472,284	3,982,078	Jan. 13, 1976	Sep. 21, 1976
B 472,760	4,001,330	Apr. 13, 1976	Jan. 4, 1977
B 473,039	3,985,747	Feb. 10, 1976	Oct. 12, 1976
B 473,040	3,985,738	Feb. 10, 1976	Oct. 12, 1976
B 473,813	3,989,071	Mar. 9, 1976	Nov. 2, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 473,972	3,984,043	Jan. 13, 1976	Oct. 5, 1976
B 474,573	3,988,375	Jan. 20, 1976	Oct. 26, 1976
B 474,747	3,997,704	Feb. 24, 1976	Dec. 14, 1976
B 475,236	3,989,990	Feb. 3, 1976	Nov. 2, 1976
B 475,385	4,001,071	Mar. 9, 1976	Jan. 4, 1977
B 475,681	3,983,332	Jan. 20, 1976	Sep. 28, 1976
B 476,267	4,005,068	Apr. 6, 1976	Jan. 25, 1977
B 476,372	3,985,771	Feb. 24, 1976	Oct. 12, 1976
B 476,568	3,999,456	Mar. 16, 1976	Dec. 28, 1976
B 476,577	3,982,070	Jan. 20, 1976	Sep. 21, 1976
B 476,681	3,986,181	Jan. 13, 1976	Oct. 12, 1976
B 476,776	3,998,715	Mar. 23, 1976	Dec. 21, 1976
B 476,967	3,995,206	Mar. 9, 1976	Nov. 30, 1976
B 477,252	3,985,759	Jan. 13, 1976	Oct. 12, 1976
B 477,481	3,991,076	Feb. 3, 1976	Nov. 9, 1976
B 477,584	D 242,855	Apr. 6, 1976	Dec. 28, 1976
B 477,597	3,993,912	Feb. 17, 1976	Nov. 23, 1976
B 478,739	3,992,253	Feb. 17, 1976	Nov. 16, 1976
B 479,175	3,985,700	Feb. 17, 1976	Oct. 12, 1976
B 479,242	3,983,074	Feb. 17, 1976	Sep. 28, 1976
B 479,502	3,999,030	Mar. 16, 1976	Dec. 21, 1976
B 479,681	D 242,672	Mar. 16, 1976	Dec. 14, 1976
B 479,969	4,001,132	Mar. 9, 1976	Jan. 4, 1977
B 480,114	4,001,327	Mar. 2, 1976	Jan. 4, 1977
B 480,292	3,994,011	Mar. 16, 1976	Nov. 23, 1976
B 480,350	3,994,164	Feb. 10, 1976	Nov. 30, 1976
B 480,384	3,999,737	Mar. 23, 1976	Dec. 28, 1976
B 480,452	3,994,923	Feb. 10, 1976	Nov. 30, 1976
B 480,473	3,995,608	Mar. 2, 1976	Dec. 7, 1976
B 480,604	3,985,251	Jan. 13, 1976	Oct. 12, 1976
B 480,625	3,996,227	Feb. 24, 1976	Dec. 7, 1976
B 480,662	3,988,382	Mar. 2, 1976	Oct. 26, 1976
B 480,740	3,996,431	Mar. 2, 1976	Dec. 7, 1976
B 480,749	3,999,207	Mar. 9, 1976	Dec. 21, 1976
B 480,987	4,001,459	Mar. 30, 1976	Jan. 4, 1977
B 481,048	3,998,542	Mar. 16, 1976	Dec. 21, 1976
B 481,600	3,981,235	Jan. 27, 1976	Sep. 21, 1976
B 481,737	3,982,057	Jan. 13, 1976	Sep. 21, 1976
B 481,778	4,001,385	Mar. 30, 1976	Jan. 4, 1977
B 481,930	3,992,717	Feb. 24, 1976	Nov. 16, 1976
B 482,058	4,001,398	Mar. 2, 1976	Jan. 4, 1977
B 482,660	3,995,026	Feb. 10, 1976	Nov. 30, 1976
B 482,709	3,985,733	Feb. 24, 1976	Oct. 12, 1976
B 482,907	3,984,811	Jan. 20, 1976	Oct. 5, 1976
B 483,247	4,001,889	Apr. 13, 1976	Jan. 4, 1977
B 483,256	3,981,723	Feb. 10, 1976	Sep. 21, 1976
B 483,268	3,995,215	Mar. 9, 1976	Nov. 30, 1976
B 483,606	3,986,990	Jan. 27, 1976	Oct. 19, 1976
B 483,615	3,988,637	Jan. 27, 1976	Oct. 26, 1976
B 483,762	3,993,608	Feb. 10, 1976	Nov. 23, 1976
B 483,865	3,985,693	Jan. 13, 1976	Oct. 12, 1976
B 484,029	3,983,558	Feb. 10, 1976	Sep. 28, 1976
B 484,067	3,992,374	Feb. 17, 1976	Nov. 16, 1976
B 484,068	3,994,937	Mar. 2, 1976	Nov. 30, 1976
B 484,121	3,997,770	Mar. 16, 1976	Dec. 14, 1976
B 484,269	4,000,159	Feb. 10, 1976	Dec. 28, 1976
B 484,332	3,986,540	Mar. 2, 1976	Oct. 19, 1976
B 484,365	3,983,578	Jan. 27, 1976	Sep. 28, 1976
B 484,419	4,001,292	Mar. 9, 1976	Jan. 4, 1977
B 484,482	3,994,017	Mar. 23, 1976	Nov. 23, 1976
B 484,769	3,999,498	Mar. 16, 1976	Dec. 28, 1976
B 485,051	3,992,418	Feb. 17, 1976	Nov. 16, 1976
B 485,060	3,983,067	Feb. 17, 1976	Sep. 28, 1976
B 485,169	3,989,791	Mar. 16, 1976	Nov. 2, 1976
B 485,188	4,001,170	Mar. 16, 1976	Jan. 4, 1977
B 485,401	3,985,859	Jan. 27, 1976	Oct. 12, 1976
B 485,575	3,996,565	Feb. 24, 1976	Dec. 7, 1976
B 486,280	3,983,130	Feb. 3, 1976	Sep. 28, 1976
B 486,614	3,995,835	Feb. 17, 1976	Dec. 7, 1976
B 486,678	4,001,273	Mar. 2, 1976	Jan. 4, 1977
B 486,828	3,989,651	Mar. 2, 1976	Nov. 2, 1976
B 487,062	D 241,256	Feb. 10, 1976	Nov. 9, 1976
B 487,133	3,989,826	Jan. 27, 1976	Nov. 2, 1976
B 487,260	3,990,610	Jan. 27, 1976	Nov. 9, 1976
B 487,411	3,983,579	Feb. 24, 1976	Sep. 28, 1976
B 487,423	3,998,810	Mar. 2, 1976	Dec. 21, 1976
B 487,427	3,995,788	Mar. 2, 1976	Dec. 7, 1976
B 488,111	3,985,765	Jan. 13, 1976	Oct. 12, 1976
B 488,395	3,982,245	Jan. 27, 1976	Sep. 21, 1976
B 488,634	3,982,158	Jan. 20, 1976	Sep. 21, 1976
B 488,756	3,991,810	Mar. 16, 1976	Nov. 16, 1976
B 489,290	3,998,081	Feb. 17, 1976	Dec. 21, 1976
B 489,328	3,990,088	Jan. 20, 1976	Nov. 2, 1976
B 489,331	3,996,175	Feb. 17, 1976	Dec. 7, 1976
B 489,550	4,000,710	Mar. 16, 1976	Jan. 4, 1977
B 489,685	3,984,085	Feb. 24, 1976	Oct. 5, 1976
B 490,067	3,986,600	Jan. 27, 1976	Oct. 19, 1976
B 490,547	3,999,439	Feb. 24, 1976	Dec. 28, 1976
B 490,551	D 243,168	Apr. 6, 1976	Jan. 25, 1977
B 490,589	3,990,680	Feb. 3, 1976	Nov. 9, 1976
B 490,623	3,996,964	Mar. 2, 1976	Dec. 14, 1976
B 490,647	3,985,196	Feb. 24, 1976	Oct. 12, 1976
B 490,806	3,989,486	Feb. 3, 1976	Nov. 2, 1976
B 490,812	3,998,842	Mar. 30, 1976	Dec. 21, 1976
B 490,946	3,993,652	Feb. 17, 1976	Nov. 23, 1976
B 490,995	3,995,031	Feb. 3, 1976	Nov. 30, 1976
B 491,032	3,981,892	Feb. 10, 1976	Sep. 21, 1976
B 491,052	3,985,790	Mar. 2, 1976	Oct. 12, 1976
B 491,111	3,997,916	Feb. 17, 1976	Dec. 14, 1976
B 491,455	3,991,167	Feb. 3, 1976	Nov. 9, 1976
B 491,501	3,984,914	Jan. 13, 1976	Oct. 12, 1976
B 491,650	3,999,044	Mar. 9, 1976	Dec. 21, 1976
B 491,673	3,994,770	Feb. 17, 1976	Nov. 30, 1976
B 491,776	3,986,298	Mar. 16, 1976	Oct. 19, 1976
B 491,883	3,984,412	Feb. 3, 1976	Oct. 5, 1976
B 491,906	D 242,223	Feb. 10, 1976	Nov. 9, 1976
B 492,039	3,997,541	Feb. 24, 1976	Dec. 14, 1976
B 492,093	4,003,658	Mar. 23, 1976	Jan. 18, 1977
B 492,120	3,995,692	Feb. 24, 1976	Dec. 7, 1976
B 492,301	3,981,073	Jan. 13, 1976	Sep. 21, 1976
B 492,688	3,983,415	Jan. 20, 1976	Sep. 28, 1976
B 492,716	3,998,739	Mar. 2, 1976	Dec. 21, 1976
B 492,774	4,001,843	Mar. 9, 1976	Jan. 4, 1977
B 492,902	3,993,859	Feb. 24, 1976	Nov. 23, 1976
B 492,946	3,991,303	Jan. 27, 1976	Nov. 9, 1976
B 493,370	3,984,792	Mar. 16, 1976	Oct. 5, 1976
B 493,501	3,988,061	Feb. 3, 1976	Oct. 26, 1976
B 493,955	3,989,830	Mar. 9, 1976	Nov. 2, 1976
B 493,981	3,990,165	Mar. 9, 1976	Nov. 9, 1976
B 494,234	3,983,808	Feb. 10, 1976	Oct. 5, 1976
B 494,339	4,001,255	Mar. 16, 1976	Jan. 4, 1977
B 494,383	3,991,289	Feb. 3, 1976	Nov. 9, 1976
B 494,669	3,991,104	Feb. 3, 1976	Nov. 9, 1976
B 494,691	3,987,457	Mar. 16, 1976	Oct. 19, 1976
B 494,806	3,989,210	Feb. 3, 1976	Nov. 2, 1976
B 494,944	3,992,469	Feb. 17, 1976	Nov. 16, 1976
B 495,185	3,999,166	Mar. 9, 1976	Dec. 21, 1976
B 495,331	4,000,456	Mar. 16, 1976	Dec. 28, 1976
B 495,402	3,983,988	Feb. 17, 1976	Oct. 5, 1976
B 495,408	4,000,222	Feb. 3, 1976	Dec. 28, 1976
B 495,489	3,984,571	Feb. 3, 1976	Oct. 5, 1976
B 495,550	3,993,666	Feb. 3, 1976	Nov. 23, 1976
B 495,554	3,993,665	Feb. 3, 1976	Nov. 23, 1976
B 495,759	3,989,998	Feb. 3, 1976	Nov. 2, 1976
B 495,903	3,995,997	Feb. 17, 1976	Dec. 7, 1976
B 496,430	3,991,140	Feb. 10, 1976	Nov. 9, 1976
B 496,431	3,985,894	Jan. 13, 1976	Oct. 12, 1976
B 496,487	3,982,261	Jan. 20, 1976	Sep. 21, 1976
B 496,500	3,985,962	Feb. 3, 1976	Oct. 12, 1976
B 496,502	3,987,444	Jan. 20, 1976	Oct. 19, 1976
B 496,792	3,999,959	Feb. 17, 1976	Dec. 28, 1976
B 496,964	3,999,219	Apr. 20, 1976	Dec. 21, 1976
B 496,999	3,983,804	Jan. 27, 1976	Oct. 5, 1976
B 497,021	3,985,039	Jan. 13, 1976	Oct. 12, 1976
B 497,194	3,988,267	Feb. 3, 1976	Oct. 26, 1976
B 497,292	3,994,052	Feb. 3, 1976	Nov. 30, 1976
B 497,473	3,990,839	Feb. 3, 1976	Nov. 9, 1976
B 497,584	3,988,184	Feb. 24, 1976	Oct. 26, 1976
B 497,702	3,996,589	Mar. 2, 1976	Dec. 7, 1976
B 497,780	3,997,500	Feb. 24, 1976	Dec. 14, 1976
B 497,853	3,987,934	Feb. 17, 1976	Oct. 26, 1976
B 497,896	D 243,091	Apr. 6, 1976	Jan. 18, 1977
B 497,960	3,991,325	Jan. 20, 1976	Nov. 9, 1976
B 498,208	4,001,480	Apr. 13, 1976	Jan. 4, 1977
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,205	3,989,611	Feb. 10, 1976	Nov. 2, 1976
B 498,500	3,982,241	Jan. 20, 1976	Sep. 21, 1976
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,820	3,996,670	Mar. 9, 1976	Dec. 14, 1976
B 498,951	3,996,907	Mar. 2, 1976	Dec. 14, 1976
B 499,171	3,985,192	Jan. 27, 1976	Oct. 12, 1976
B 499,209	3,995,907	Feb. 24, 1976	Dec. 7, 1976
B 499,227	3,981,344	Jan. 27, 1976	Sep. 21, 1976
B 499,324	4,001,375	Mar. 16, 1976	Jan. 4, 1977
B 499,352	3,981,391	Jan. 27, 1976	Sep. 21, 1976
B 499,718	3,990,058	Jan. 27, 1976	Nov. 2, 1976
B 499,786	4,000,663	Mar. 16, 1976	Jan. 4, 1977
B 500,171	3,997,262	Mar. 30, 1976	Dec. 14, 1976
B 500,176	3,995,316	Feb. 3, 1976	Nov. 30, 1976
B 500,408	D 242,721	Mar. 16, 1976	Dec. 14, 1976
B 500,945	3,996,817	Feb. 24, 1976	Dec. 14, 1976
B 500,981	3,984,681	Jan. 27, 1976	Oct. 5, 1976
B 501,122	3,981,385	Feb. 17, 1976	Sep. 21, 1976
B 501,181	3,984,761	Feb. 10, 1976	Oct. 5, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 501,253	3,994,015	Feb. 3, 1976	Nov. 23, 1976	B 511,002	3,998,717	Mar. 2, 1976	Dec. 21, 1976
B 501,317	3,985,643	Jan. 13, 1976	Oct. 12, 1976	B 511,099	3,990,162	Feb. 3, 1976	Nov. 9, 1976
B 501,415	3,982,051	Jan. 13, 1976	Sep. 21, 1976	B 511,156	3,981,364	Jan. 27, 1976	Sep. 21, 1976
B 501,503	4,001,640	Mar. 2, 1976	Jan. 4, 1977	B 511,346	3,984,072	Jan. 27, 1976	Oct. 5, 1976
B 501,540	3,985,694	Jan. 13, 1976	Oct. 12, 1976	B 511,407	3,981,485	Feb. 10, 1976	Sep. 21, 1976
B 501,975	3,998,466	Mar. 2, 1976	Dec. 21, 1976	B 511,454	3,982,333	Feb. 24, 1976	Sep. 28, 1976
B 501,993	3,981,606	Jan. 13, 1976	Sep. 21, 1976	B 511,665	4,001,037	Mar. 2, 1976	Jan. 4, 1977
B 502,151	3,998,614	Mar. 23, 1976	Dec. 21, 1976	B 511,885	3,981,346	Jan. 27, 1976	Sep. 21, 1976
B 502,161	4,000,500	Mar. 2, 1976	Dec. 28, 1976	B 511,886	3,989,991	Feb. 3, 1976	Nov. 2, 1976
B 502,289	3,982,274	Jan. 13, 1976	Sep. 21, 1976	B 511,909	3,981,183	Feb. 17, 1976	Sep. 21, 1976
B 502,381	D 242,231	Mar. 16, 1976	Nov. 9, 1976	B 512,324	3,985,084	Feb. 17, 1976	Oct. 12, 1976
B 502,540	3,983,698	Jan. 13, 1976	Oct. 5, 1976	B 512,547	3,984,193	Jan. 13, 1976	Oct. 5, 1976
B 502,571	D 242,433	Apr. 6, 1976	Nov. 23, 1976	B 512,745	3,981,294	Jan. 13, 1976	Sep. 21, 1976
B 502,589	3,989,652	Jan. 27, 1976	Nov. 2, 1976	B 512,818	3,997,363	Apr. 6, 1976	Dec. 14, 1976
B 502,652	3,989,186	Feb. 24, 1976	Nov. 2, 1976	B 512,849	3,982,141	Feb. 3, 1976	Sep. 21, 1976
B 502,667	3,991,431	Feb. 24, 1976	Nov. 16, 1976	B 512,964	3,995,279	Feb. 10, 1976	Nov. 30, 1976
B 502,973	3,982,161	Jan. 27, 1976	Sep. 21, 1976	B 513,014	3,991,113	Feb. 10, 1976	Nov. 9, 1976
B 502,993	3,992,489	Feb. 17, 1976	Nov. 16, 1976	B 513,027	3,995,143	Feb. 17, 1976	Nov. 30, 1976
B 503,029	3,986,879	Jan. 27, 1976	Oct. 19, 1976	B 513,280	3,988,211	Jan. 20, 1976	Oct. 26, 1976
B 503,345	4,001,235	Feb. 24, 1976	Jan. 4, 1977	B 513,368	3,982,138	Feb. 3, 1976	Sep. 21, 1976
B 503,436	3,988,819	Feb. 24, 1976	Nov. 2, 1976	B 513,706	3,986,064	Jan. 13, 1976	Oct. 12, 1976
B 503,521	3,999,646	Mar. 16, 1976	Dec. 28, 1976	B 513,756	3,993,869	Feb. 3, 1976	Nov. 23, 1976
B 503,579	3,989,680	Feb. 10, 1976	Nov. 2, 1976	B 513,781	4,001,324	Feb. 24, 1976	Jan. 4, 1977
B 503,618	3,997,782	Mar. 9, 1976	Dec. 14, 1976	B 513,789	3,981,599	Feb. 3, 1976	Sep. 21, 1976
B 503,742	3,989,756	Feb. 17, 1976	Nov. 2, 1976	B 514,687	3,986,522	Jan. 27, 1976	Oct. 19, 1976
B 503,780	3,990,055	Mar. 16, 1976	Nov. 2, 1976	B 515,135	3,990,085	Feb. 17, 1976	Nov. 2, 1976
B 503,817	3,988,307	Jan. 13, 1976	Oct. 26, 1976	B 515,303	3,987,939	Jan. 20, 1976	Oct. 26, 1976
B 504,056	3,993,923	Feb. 24, 1976	Nov. 23, 1976	B 515,452	3,995,243	Feb. 10, 1976	Nov. 30, 1976
B 504,061	3,987,534	Mar. 16, 1976	Oct. 26, 1976	B 515,455	3,982,149	Jan. 27, 1976	Sep. 21, 1976
B 504,156	3,999,048	Mar. 23, 1976	Dec. 21, 1976	B 515,642	4,001,258	Feb. 24, 1976	Jan. 4, 1977
B 504,169	3,981,219	Jan. 13, 1976	Sep. 21, 1976	B 515,908	3,984,676	Jan. 20, 1976	Oct. 5, 1976
B 504,404	3,996,499	Feb. 24, 1976	Dec. 7, 1976	B 516,002	3,988,638	Jan. 13, 1976	Oct. 26, 1976
B 504,439	3,999,398	Mar. 16, 1976	Dec. 28, 1976	B 516,032	3,986,634	Jan. 27, 1976	Oct. 19, 1976
B 504,503	3,999,210	Mar. 9, 1976	Dec. 21, 1976	B 516,047	3,985,741	Feb. 10, 1976	Oct. 12, 1976
B 504,582	4,005,138	Mar. 30, 1976	Jan. 25, 1977	B 516,060	3,983,572	Feb. 17, 1976	Sep. 28, 1976
B 504,778	3,986,650	Feb. 24, 1976	Oct. 19, 1976	B 516,069	3,986,208	Mar. 16, 1976	Oct. 12, 1976
B 504,877	3,997,564	Feb. 24, 1976	Dec. 14, 1976	B 516,296	3,984,404	Feb. 3, 1976	Oct. 5, 1976
B 504,899	3,991,273	Mar. 9, 1976	Nov. 9, 1976	B 516,537	3,996,784	Feb. 17, 1976	Dec. 14, 1976
B 505,126	3,981,745	Feb. 10, 1976	Sep. 21, 1976	B 516,564	3,993,931	Feb. 17, 1976	Nov. 23, 1976
B 505,582	4,001,659	Mar. 23, 1976	Jan. 4, 1977	B 516,609	3,994,486	Feb. 24, 1976	Nov. 30, 1976
B 505,689	3,987,631	Mar. 2, 1976	Oct. 26, 1976	B 516,804	3,991,209	Mar. 23, 1976	Nov. 9, 1976
B 505,813	3,985,175	Jan. 13, 1976	Oct. 12, 1976	B 516,825	3,988,885	Feb. 3, 1976	Nov. 2, 1976
B 506,144	3,991,147	Feb. 10, 1976	Nov. 9, 1976	B 517,273	D 242,798	Mar. 16, 1976	Dec. 21, 1976
B 506,148	3,988,319	Feb. 3, 1976	Oct. 26, 1976	B 517,504	3,999,855	Mar. 9, 1976	Dec. 28, 1976
B 506,167	3,990,652	Feb. 10, 1976	Nov. 9, 1976	B 517,762	3,986,065	Mar. 16, 1976	Oct. 12, 1976
B 506,286	3,982,085	Jan. 20, 1976	Sep. 21, 1976	B 517,858	4,000,999	Feb. 17, 1976	Jan. 4, 1977
B 506,461	3,987,348	Jan. 20, 1976	Oct. 19, 1976	B 517,956	D 243,088	Apr. 6, 1976	Jan. 18, 1977
B 506,566	3,985,402	Jan. 20, 1976	Oct. 12, 1976	B 517,957	D 243,089	Apr. 6, 1976	Jan. 18, 1977
B 506,624	3,999,695	Mar. 9, 1976	Dec. 28, 1976	B 518,226	3,993,509	Feb. 10, 1976	Nov. 23, 1976
B 506,648	3,994,857	Feb. 3, 1976	Nov. 30, 1976	B 518,656	3,989,732	Feb. 17, 1976	Nov. 2, 1976
B 506,744	3,981,176	Jan. 13, 1976	Sep. 21, 1976	B 518,859	3,989,971	Feb. 3, 1976	Nov. 2, 1976
B 506,839	4,005,389	Mar. 23, 1976	Jan. 25, 1977	B 518,999	3,990,323	Feb. 3, 1976	Nov. 9, 1976
B 506,840	4,002,928	Mar. 23, 1976	Jan. 11, 1977	B 519,095	3,993,621	Feb. 24, 1976	Nov. 23, 1976
B 506,916	3,986,140	Feb. 3, 1976	Oct. 12, 1976	B 519,377	3,987,223	Jan. 27, 1976	Oct. 19, 1976
B 506,926	3,993,232	Feb. 17, 1976	Nov. 23, 1976	B 519,446	3,985,815	Feb. 24, 1976	Oct. 12, 1976
B 507,087	3,991,389	Feb. 17, 1976	Nov. 9, 1976	B 519,485	3,991,134	Feb. 10, 1976	Nov. 9, 1976
B 507,131	4,000,499	Mar. 2, 1976	Dec. 28, 1976	B 519,486	3,992,481	Feb. 17, 1976	Nov. 16, 1976
B 507,396	3,995,167	Feb. 10, 1976	Nov. 30, 1976	B 519,487	3,992,337	Feb. 17, 1976	Nov. 16, 1976
B 507,476	3,994,680	Feb. 10, 1976	Nov. 30, 1976	B 519,599	3,995,350	Feb. 17, 1976	Dec. 7, 1976
B 507,647	3,982,240	Jan. 27, 1976	Sep. 21, 1976	B 519,932	3,988,618	Feb. 3, 1976	Oct. 26, 1976
B 508,118	3,992,283	Feb. 17, 1976	Nov. 16, 1976	B 519,979	3,982,067	Feb. 3, 1976	Sep. 21, 1976
B 508,119	3,992,285	Feb. 17, 1976	Nov. 16, 1976	B 520,063	3,989,934	Mar. 2, 1976	Nov. 2, 1976
B 508,369	3,985,847	Jan. 13, 1976	Oct. 12, 1976	B 520,075	3,989,935	Feb. 24, 1976	Nov. 2, 1976
B 508,639	4,004,194	Mar. 23, 1976	Jan. 18, 1977	B 520,076	3,989,936	Mar. 2, 1976	Nov. 2, 1976
B 508,817	3,989,891	Feb. 3, 1976	Nov. 2, 1976	B 520,082	3,989,937	Mar. 23, 1976	Nov. 2, 1976
B 508,878	3,994,117	Feb. 3, 1976	Nov. 30, 1976	B 520,115	4,003,072	Mar. 23, 1976	Jan. 11, 1977
B 508,940	3,981,321	Feb. 17, 1976	Sep. 21, 1976	B 520,227	4,002,823	Mar. 30, 1976	Jan. 11, 1977
B 508,961	3,987,477	Feb. 3, 1976	Oct. 19, 1976	B 520,256	3,985,730	Jan. 13, 1976	Oct. 12, 1976
B 509,043	3,996,767	Feb. 24, 1976	Dec. 14, 1976	B 520,277	3,995,635	Feb. 17, 1976	Dec. 7, 1976
B 509,165	3,999,155	Mar. 2, 1976	Dec. 21, 1976	B 520,341	3,992,028	Mar. 16, 1976	Nov. 16, 1976
B 509,185	3,989,996	Feb. 3, 1976	Nov. 2, 1976	B 520,384	3,986,592	Jan. 27, 1976	Oct. 19, 1976
B 509,238	3,982,399	Feb. 24, 1976	Sep. 28, 1976	B 520,514	3,988,308	Mar. 9, 1976	Oct. 26, 1976
B 509,474	3,997,260	Feb. 17, 1976	Dec. 14, 1976	B 520,534	3,997,119	Feb. 17, 1976	Dec. 14, 1976
B 509,606	3,989,986	Feb. 3, 1976	Nov. 2, 1976	B 520,543	3,986,768	Jan. 27, 1976	Oct. 19, 1976
B 509,772	3,999,004	Mar. 16, 1976	Dec. 21, 1976	B 520,546	4,001,133	Mar. 2, 1976	Jan. 4, 1977
B 510,184	D 242,784	Apr. 6, 1976	Dec. 21, 1976	B 520,613	3,991,341	Mar. 16, 1976	Nov. 9, 1976
B 510,281	3,993,215	Mar. 9, 1976	Nov. 23, 1976	B 520,658	3,998,778	Mar. 9, 1976	Dec. 21, 1976
B 510,346	D 242,207	Feb. 10, 1976	Nov. 9, 1976	B 520,884	4,000,433	Mar. 16, 1976	Dec. 28, 1976
B 510,458	4,000,221	Feb. 10, 1976	Dec. 28, 1976	B 520,924	3,982,113	Jan. 27, 1976	Sep. 21, 1976
B 510,521	3,990,656	Mar. 2, 1976	Nov. 9, 1976	B 520,928	3,983,617	Jan. 13, 1976	Oct. 5, 1976
B 510,588	3,981,539	Jan. 27, 1976	Sep. 21, 1976	B 520,952	4,000,876	Mar. 16, 1976	Jan. 4, 1977
B 510,677	3,989,541	Feb. 24, 1976	Nov. 2, 1976	B 521,025	3,998,838	Mar. 23, 1976	Dec. 21, 1976
B 510,682	4,000,978	Mar. 30, 1976	Jan. 4, 1977	B 521,044	3,983,435	Feb. 24, 1976	Sep. 28, 1976
B 510,850	3,989,841	Feb. 3, 1976	Nov. 2, 1976	B 521,045	3,983,433	Feb. 24, 1976	Sep. 28, 1976
B 510,855	3,981,059	Jan. 27, 1976	Sep. 21, 1976	B 521,046	3,983,434	Feb. 24, 1976	Sep. 28, 1976
B 511,907	3,999,622	Mar. 30, 1976	Dec. 28, 1976	B 521,125	3,994,865	Feb. 10, 1976	Nov. 30, 1976
B 510,998	3,992,336	Feb. 10, 1976	Nov. 16, 1976	B 521,126	3,997,510	Feb. 10, 1976	Dec. 14, 1976

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DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 521,127	3,996,201	Feb. 17, 1976	Dec. 7, 1976
B 521,128	3,997,511	Feb. 10, 1976	Dec. 14, 1976
B 521,324	3,983,143	Jan. 27, 1976	Sep. 28, 1976
B 521,480	3,982,665	Jan. 13, 1976	Sep. 28, 1976
B 521,600	3,981,458	Jan. 27, 1976	Sep. 21, 1976
B 521,612	4,000,251	Mar. 9, 1976	Dec. 28, 1976
B 521,620	3,983,749	Jan. 27, 1976	Oct. 5, 1976
B 521,643	3,997,567	Mar. 2, 1976	Dec. 14, 1976
B 521,711	3,989,835	Feb. 10, 1976	Nov. 2, 1976
B 521,793	3,996,981	Feb. 24, 1976	Dec. 14, 1976
B 521,984	3,983,220	Feb. 17, 1976	Sep. 28, 1976
B 521,986	3,981,607	Feb. 3, 1976	Sep. 21, 1976
B 522,009	3,995,444	Feb. 17, 1976	Dec. 7, 1976
B 522,038	3,993,119	Feb. 3, 1976	Nov. 23, 1976
B 522,227	3,992,904	Mar. 30, 1976	Nov. 23, 1976
B 522,309	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 522,354	3,984,959	Jan. 20, 1976	Oct. 12, 1976
B 522,446	4,001,194	Mar. 30, 1976	Jan. 4, 1977
B 522,537	3,999,587	Mar. 30, 1976	Dec. 28, 1976
B 522,567	3,996,238	Feb. 17, 1976	Dec. 7, 1976
B 522,568	D 242,785	Apr. 6, 1976	Dec. 21, 1976
B 522,577	3,982,123	Jan. 27, 1976	Sep. 21, 1976
B 522,629	4,001,155	Mar. 16, 1976	Jan. 4, 1977
B 523,696	3,986,071	Jan. 13, 1976	Oct. 12, 1976
B 523,885	3,981,040	Feb. 17, 1976	Sep. 21, 1976
B 523,952	3,988,707	Mar. 23, 1976	Oct. 26, 1976
B 524,026	3,992,206	Feb. 10, 1976	Nov. 16, 1976
B 524,121	3,982,536	Feb. 3, 1976	Sep. 28, 1976
B 524,179	3,985,872	Jan. 13, 1976	Oct. 12, 1976
B 524,464	3,985,580	Feb. 10, 1976	Oct. 12, 1976
B 524,806	4,000,065	Mar. 2, 1976	Dec. 28, 1976
B 525,133	3,996,481	Mar. 23, 1976	Dec. 7, 1976
B 525,204	4,001,109	Mar. 16, 1976	Jan. 4, 1977
B 525,809	3,985,040	Feb. 24, 1976	Oct. 12, 1976
B 525,961	3,985,557	Jan. 13, 1976	Oct. 12, 1976
B 526,106	3,990,073	Jan. 27, 1976	Nov. 2, 1976
B 526,190	3,982,129	Feb. 17, 1976	Sep. 21, 1976
B 526,289	3,992,641	Feb. 24, 1976	Nov. 16, 1976
B 526,388	3,992,017	Feb. 3, 1976	Nov. 16, 1976
B 526,445	3,984,978	Jan. 20, 1976	Oct. 12, 1976
B 526,447	4,000,052	Feb. 24, 1976	Dec. 28, 1976
B 526,510	3,989,708	Jan. 20, 1976	Nov. 2, 1976
B 526,997	3,985,695	Jan. 13, 1976	Oct. 12, 1976
B 527,054	3,981,559	Feb. 17, 1976	Sep. 21, 1976
B 527,171	3,998,248	Mar. 9, 1976	Dec. 21, 1976
B 527,187	3,995,202	Feb. 17, 1976	Nov. 30, 1976
B 527,333	3,999,732	Mar. 23, 1976	Dec. 28, 1976
B 527,669	3,982,206	Jan. 13, 1976	Sep. 21, 1976
B 527,693	3,995,233	Feb. 3, 1976	Nov. 30, 1976
B 527,788	D 242,337	Feb. 10, 1976	Nov. 16, 1976
B 527,972	4,000,016	Mar. 9, 1976	Dec. 28, 1976
B 527,999	3,981,682	Feb. 3, 1976	Sep. 21, 1976
B 528,297	4,001,138	Mar. 16, 1976	Jan. 4, 1977
B 528,303	3,991,023	Feb. 10, 1976	Nov. 9, 1976
B 528,401	3,991,619	Feb. 3, 1976	Nov. 16, 1976
B 528,756	3,990,476	Feb. 3, 1976	Nov. 9, 1976
B 528,761	3,982,221	Feb. 10, 1976	Sep. 21, 1976
B 528,962	3,989,666	Feb. 24, 1976	Nov. 2, 1976
B 528,966	3,989,667	Feb. 24, 1976	Nov. 2, 1976
B 529,156	3,989,158	Jan. 13, 1976	Nov. 2, 1976
B 529,194	4,000,776	Mar. 23, 1976	Jan. 4, 1977
B 529,659	3,996,875	Feb. 24, 1976	Dec. 14, 1976
B 529,836	3,994,345	Feb. 3, 1976	Nov. 30, 1976
B 529,974	3,987,098	Feb. 17, 1976	Oct. 19, 1976
B 530,174	3,993,635	Feb. 24, 1976	Nov. 23, 1976
B 530,255	3,996,103	Mar. 2, 1976	Dec. 7, 1976
B 530,318	3,985,752	Jan. 13, 1976	Oct. 12, 1976
B 530,569	3,999,865	Mar. 16, 1976	Dec. 28, 1976
B 530,580	4,001,151	Mar. 2, 1976	Jan. 4, 1977
B 530,605	3,989,064	Feb. 3, 1976	Nov. 2, 1976
B 530,813	3,986,131	Feb. 17, 1976	Oct. 12, 1976
B 530,873	4,001,016	Feb. 17, 1976	Jan. 4, 1977
B 530,925	3,983,161	Feb. 24, 1976	Sep. 28, 1976
B 531,096	3,984,415	Feb. 10, 1976	Oct. 5, 1976
B 531,267	3,997,040	Feb. 24, 1976	Dec. 14, 1976
B 531,425	3,992,595	Feb. 3, 1976	Nov. 16, 1976
B 531,566	3,997,820	Mar. 16, 1976	Dec. 14, 1976
B 531,686	3,990,017	Mar. 23, 1976	Nov. 2, 1976
B 531,753	3,988,843	Mar. 2, 1976	Nov. 2, 1976
B 531,929	3,986,067	Jan. 20, 1976	Oct. 12, 1976
B 532,005	3,992,397	Feb. 24, 1976	Nov. 16, 1976
B 532,140	4,001,299	Mar. 2, 1976	Jan. 4, 1977
B 532,319	3,990,292	Feb. 3, 1976	Nov. 9, 1976
B 532,326	3,993,959	Mar. 23, 1976	Nov. 23, 1976
B 532,424	D 242,292	Feb. 10, 1976	Nov. 9, 1976
B 532,476	3,992,756	Feb. 3, 1976	Nov. 23, 1976
B 532,901	3,984,318	Jan. 13, 1976	Oct. 5, 1976
B 532,969	3,981,706	Jan. 13, 1976	Sep. 21, 1976
B 532,976	4,000,837	Mar. 23, 1976	Jan. 4, 1977
B 533,056	3,983,969	Jan. 13, 1976	Oct. 5, 1976
B 533,259	3,999,556	Feb. 24, 1976	Dec. 28, 1976
B 533,454	3,996,566	Mar. 2, 1976	Dec. 7, 1976
B 533,580	3,982,255	Feb. 3, 1976	Sep. 21, 1976
B 533,652	4,000,196	Mar. 23, 1976	Dec. 28, 1976
B 533,734	3,984,799	Jan. 27, 1976	Oct. 5, 1976
B 533,968	3,986,576	Jan. 27, 1976	Oct. 19, 1976
B 534,016	3,983,381	Feb. 3, 1976	Sep. 28, 1976
B 534,313	3,981,675	Jan. 27, 1976	Sep. 21, 1976
B 534,314	3,981,786	Feb. 10, 1976	Sep. 21, 1976
B 534,333	3,981,480	Feb. 17, 1976	Sep. 21, 1976
B 534,334	D 242,722	Mar. 16, 1976	Dec. 14, 1976
B 534,443	3,989,970	Jan. 27, 1976	Nov. 2, 1976
B 534,574	3,995,624	Feb. 24, 1976	Dec. 7, 1976
B 534,591	3,991,141	Feb. 17, 1976	Nov. 9, 1976
B 534,767	3,982,180	Feb. 3, 1976	Sep. 21, 1976
B 534,991	3,983,517	Jan. 27, 1976	Sep. 28, 1976
B 535,076	3,981,718	Jan. 20, 1976	Sep. 21, 1976
B 535,209	4,001,873	Mar. 16, 1976	Jan. 4, 1977
B 535,256	3,999,150	Mar. 23, 1976	Dec. 21, 1976
B 535,268	3,999,045	Mar. 30, 1976	Dec. 21, 1976
B 535,386	3,981,150	Jan. 13, 1976	Sep. 21, 1976
B 535,391	3,981,386	Jan. 27, 1976	Sep. 21, 1976
B 535,411	3,990,543	Feb. 24, 1976	Nov. 9, 1976
B 535,437	3,997,555	Feb. 24, 1976	Dec. 14, 1976
B 535,448	3,997,123	Mar. 16, 1976	Dec. 14, 1976
B 535,466	3,981,309	Jan. 27, 1976	Sep. 21, 1976
B 535,813	3,981,819	Jan. 27, 1976	Sep. 21, 1976
B 535,928	3,981,466	Jan. 13, 1976	Sep. 21, 1976
B 536,009	3,982,112	Jan. 27, 1976	Sep. 21, 1976
B 536,082	3,997,783	Mar. 16, 1976	Dec. 14, 1976
B 536,322	4,001,272	Mar. 23, 1976	Jan. 4, 1977
B 536,403	3,998,341	Mar. 23, 1976	Dec. 21, 1976
B 536,511	3,995,989	Mar. 9, 1976	Dec. 7, 1976
B 536,675	3,985,773	Jan. 20, 1976	Oct. 12, 1976
B 536,935	3,985,729	Jan. 13, 1976	Oct. 12, 1976
B 537,058	4,000,969	Mar. 23, 1976	Jan. 4, 1977
B 537,102	3,981,829	Jan. 13, 1976	Sep. 21, 1976
B 537,709	3,981,368	Jan. 13, 1976	Sep. 21, 1976
B 537,711	3,985,748	Jan. 13, 1976	Oct. 12, 1976
B 537,722	3,985,423	Feb. 3, 1976	Oct. 12, 1976
B 537,903	3,986,492	Jan. 20, 1976	Oct. 19, 1976
B 538,472	3,992,884	Feb. 3, 1976	Nov. 23, 1976
B 538,491	3,982,928	Feb. 17, 1976	Sep. 28, 1976
B 538,686	3,982,199	Jan. 13, 1976	Sep. 21, 1976
B 538,753	3,993,642	Feb. 10, 1976	Nov. 23, 1976
B 539,374	3,996,229	Mar. 9, 1976	Dec. 7, 1976
B 539,746	3,983,423	Feb. 17, 1976	Sep. 28, 1976
B 540,078	3,984,701	Jan. 13, 1976	Oct. 5, 1976
B 540,218	3,986,108	Feb. 10, 1976	Oct. 12, 1976
B 540,632	3,981,600	Jan. 13, 1976	Sep. 21, 1976
B 540,767	3,986,010	Mar. 16, 1976	Oct. 12, 1976
B 540,872	3,982,135	Jan. 20, 1976	Sep. 21, 1976
B 541,015	3,993,208	Jan. 27, 1976	Nov. 23, 1976
B 541,376	3,981,690	Feb. 17, 1976	Sep. 21, 1976
B 541,415	3,982,080	Feb. 3, 1976	Sep. 21, 1976
B 541,464	3,995,424	Feb. 17, 1976	Dec. 7, 1976
B 541,496	3,982,232	Jan. 27, 1976	Sep. 21, 1976
B 541,517	3,986,156	Jan. 13, 1976	Oct. 12, 1976
B 541,710	3,994,472	Feb. 24, 1976	Nov. 30, 1976
B 542,135	3,986,939	Feb. 10, 1976	Oct. 19, 1976
B 542,158	3,981,886	Jan. 13, 1976	Sep. 21, 1976
B 542,226	3,993,748	Feb. 24, 1976	Nov. 23, 1976
B 543,078	3,995,687	Feb. 17, 1976	Dec. 7, 1976
B 543,941	3,985,528	Jan. 13, 1976	Oct. 12, 1976
B 544,034	3,997,175	Feb. 17, 1976	Dec. 14, 1976
B 544,476	3,993,585	Feb. 24, 1976	Nov. 23, 1976
B 544,899	3,994,962	Feb. 17, 1976	Nov. 30, 1976
B 544,961	3,983,492	Jan. 13, 1976	Sep. 28, 1976
B 545,050	3,982,073	Jan. 20, 1976	Sep. 21, 1976
B 545,265	D 243,090	Apr. 13, 1976	Jan. 18, 1977
B 545,299	4,001,259	Feb. 24, 1976	Jan. 4, 1977
B 545,464	3,992,387	Feb. 10, 1976	Nov. 16, 1976
B 545,630	3,981,337	Jan. 27, 1976	Sep. 21, 1976
B 545,777	4,004,906	Jan. 27, 1976	Jan. 25, 1977
B 545,935	3,990,337	Jan. 27, 1976	Nov. 9, 1976
B 545,945	3,995,260	Jan. 27, 1976	Nov. 30, 1976
B 546,097	3,999,309	Mar. 23, 1976	Dec. 28, 1976
B 546,295	3,987,070	Jan. 20, 1976	Oct. 19, 1976
B 546,426	3,982,063	Jan. 27, 1976	Sep. 21, 1976
B 546,631	3,983,729	Feb. 3, 1976	Oct. 5, 1976
B 546,665	3,990,062	Jan. 20, 1976	Nov. 2, 1976
B 546,911	3,981,058	Jan. 13, 1976	Sep. 21, 1976
B 546,922	3,987,742	Mar. 16, 1976	Oct. 26, 1976
B 547,016	3,999,741	Mar. 23, 1976	Dec. 28, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 547,208	4,001,218	Feb. 24, 1976	Jan. 4, 1977	B 563,165	4,000,977	Mar. 9, 1976	Jan. 4, 1977
B 547,547	3,997,670	Feb. 24, 1976	Dec. 14, 1976	B 563,244	3,983,562	Jan. 27, 1976	Sep. 28, 1976
B 547,994	3,990,081	Jan. 20, 1976	Nov. 2, 1976	B 563,301	3,995,589	Feb. 17, 1976	Dec. 7, 1976
B 548,028	3,991,517	Feb. 3, 1976	Nov. 16, 1976	B 563,412	3,992,127	Feb. 24, 1976	Nov. 16, 1976
B 548,058	3,983,050	Feb. 17, 1976	Sep. 28, 1976	B 563,419	3,999,051	Mar. 23, 1976	Dec. 21, 1976
B 548,155	3,981,477	Jan. 13, 1976	Sep. 21, 1976	B 563,722	3,990,925	Jan. 13, 1976	Nov. 9, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976	B 563,780	3,987,769	Feb. 3, 1976	Oct. 26, 1976
B 548,302	3,983,414	Feb. 17, 1976	Sep. 28, 1976	B 563,932	4,000,638	Mar. 23, 1976	Jan. 4, 1977
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976	B 564,252	4,001,293	Mar. 2, 1976	Jan. 4, 1977
B 548,462	D 242,283	Feb. 10, 1976	Nov. 9, 1976	B 564,314	3,984,996	Jan. 20, 1976	Oct. 12, 1976
B 548,688	3,995,984	Mar. 9, 1976	Dec. 7, 1976	B 564,902	4,001,351	Mar. 23, 1976	Jan. 4, 1977
B 548,719	3,990,553	Feb. 17, 1976	Nov. 9, 1976	B 565,180	3,981,685	Jan. 27, 1976	Sep. 21, 1976
B 548,978	3,998,139	Mar. 9, 1976	Dec. 21, 1976	B 565,275	3,990,299	Apr. 6, 1976	Nov. 9, 1976
B 549,198	3,981,975	Jan. 13, 1976	Sep. 21, 1976	B 565,717	3,999,138	Apr. 13, 1976	Dec. 21, 1976
B 549,244	3,981,125	Jan. 27, 1976	Sep. 21, 1976	B 566,464	3,996,367	Feb. 3, 1976	Dec. 7, 1976
B 549,394	3,981,611	Jan. 27, 1976	Sep. 21, 1976	B 566,556	3,998,511	Mar. 23, 1976	Dec. 21, 1976
B 549,931	3,986,141	Jan. 20, 1976	Oct. 12, 1976	B 566,572	3,988,590	Mar. 16, 1976	Oct. 26, 1976
B 549,964	3,995,899	Feb. 24, 1976	Dec. 7, 1976	B 565,585	4,001,083	Mar. 2, 1976	Jan. 4, 1977
B 550,693	3,982,194	Jan. 20, 1976	Sep. 21, 1976	B 567,058	3,985,188	Jan. 13, 1976	Oct. 12, 1976
B 550,744	3,993,550	Feb. 17, 1976	Nov. 23, 1976	B 567,158	3,988,073	Mar. 23, 1976	Oct. 26, 1976
B 550,810	4,000,910	Mar. 23, 1976	Jan. 4, 1977	B 567,207	3,991,689	Apr. 13, 1976	Nov. 16, 1976
B 551,133	3,996,740	Mar. 2, 1976	Dec. 14, 1976	B 567,435	3,995,724	Feb. 3, 1976	Dec. 7, 1976
B 551,463	3,996,254	Feb. 17, 1976	Dec. 7, 1976	B 567,854	3,985,038	Feb. 3, 1976	Oct. 12, 1976
B 551,527	3,982,599	Jan. 13, 1976	Sep. 28, 1976	B 567,892	4,000,855	Mar. 16, 1976	Jan. 4, 1977
B 551,809	3,996,743	Feb. 24, 1976	Dec. 14, 1976	B 568,226	3,992,698	Feb. 24, 1976	Nov. 16, 1976
B 551,952	Re. 29,059	Mar. 2, 1976	Dec. 7, 1976	B 568,270	3,982,213	Feb. 10, 1976	Sep. 21, 1976
B 552,006	3,992,129	Feb. 3, 1976	Nov. 16, 1976	B 569,125	3,986,980	Feb. 24, 1976	Oct. 19, 1976
B 552,489	3,994,864	Feb. 10, 1976	Nov. 30, 1976	B 569,293	4,004,149	Mar. 30, 1976	Jan. 18, 1977
B 552,498	3,983,139	Jan. 13, 1976	Sep. 28, 1976	B 569,501	3,999,250	Mar. 9, 1976	Dec. 28, 1976
B 552,508	4,001,250	Mar. 16, 1976	Jan. 4, 1977	B 569,519	3,993,133	Feb. 3, 1976	Nov. 23, 1976
B 552,629	3,994,773	Mar. 23, 1976	Nov. 30, 1976	B 569,646	3,985,222	Jan. 13, 1976	Oct. 12, 1976
B 552,709	4,001,467	Mar. 23, 1976	Jan. 4, 1977	B 569,859	3,994,160	Mar. 9, 1976	Nov. 30, 1976
B 552,932	3,989,292	Feb. 3, 1976	Nov. 2, 1976	B 570,172	3,987,763	Feb. 3, 1976	Oct. 26, 1976
B 553,421	4,001,146	Mar. 23, 1976	Jan. 4, 1977	B 570,615	3,998,570	Mar. 23, 1976	Dec. 21, 1976
B 553,460	3,990,019	Feb. 3, 1976	Nov. 2, 1976	B 570,862	3,991,639	Feb. 24, 1976	Nov. 16, 1976
B 553,584	3,992,456	Feb. 17, 1976	Nov. 16, 1976	B 571,219	3,991,388	Feb. 24, 1976	Nov. 9, 1976
B 553,629	3,999,242	Feb. 24, 1976	Dec. 28, 1976	B 571,638	4,001,244	Mar. 9, 1976	Jan. 4, 1977
B 554,039	3,999,944	Feb. 24, 1976	Dec. 28, 1976	B 571,659	3,995,186	Apr. 13, 1976	Nov. 30, 1976
B 554,164	4,001,465	Mar. 9, 1976	Jan. 4, 1977	B 572,642	3,990,715	Feb. 10, 1976	Nov. 9, 1976
B 554,283	3,981,152	Jan. 27, 1976	Sep. 21, 1976	B 573,033	3,995,224	Mar. 23, 1976	Nov. 30, 1976
B 554,291	4,001,209	Mar. 9, 1976	Jan. 4, 1977	B 573,994	4,000,641	Mar. 23, 1976	Jan. 4, 1977
B 554,380	4,001,147	Mar. 9, 1976	Jan. 4, 1977	B 574,128	3,982,961	Feb. 17, 1976	Sep. 28, 1976
B 554,594	3,985,960	Jan. 20, 1976	Oct. 12, 1976	B 574,616	4,000,424	Mar. 2, 1976	Dec. 28, 1976
B 554,848	4,001,265	Feb. 24, 1976	Jan. 4, 1977	B 574,996	3,989,718	Feb. 17, 1976	Nov. 2, 1976
B 554,939	3,994,013	Feb. 10, 1976	Nov. 23, 1976	B 575,583	4,000,928	Mar. 16, 1976	Jan. 4, 1977
B 555,437	3,991,152	Feb. 3, 1976	Nov. 9, 1976	B 575,757	3,981,170	Jan. 27, 1976	Sep. 21, 1976
B 555,456	3,993,423	Mar. 30, 1976	Nov. 23, 1976	B 575,851	3,985,826	Feb. 10, 1976	Oct. 12, 1976
B 555,772	3,982,641	Jan. 13, 1976	Sep. 28, 1976	B 576,859	3,991,526	Feb. 24, 1976	Nov. 16, 1976
B 556,057	3,985,349	Jan. 13, 1976	Oct. 12, 1976	B 576,903	3,995,032	Feb. 3, 1976	Nov. 30, 1976
B 556,496	3,990,244	Mar. 16, 1976	Nov. 9, 1976	B 578,447	3,982,658	Jan. 20, 1976	Sep. 28, 1976
B 556,897	3,992,972	Feb. 3, 1976	Nov. 23, 1976	B 579,104	3,982,081	Jan. 27, 1976	Sep. 21, 197
B 557,153	3,991,603	Feb. 3, 1976	Nov. 16, 1976	B 579,116	3,986,227	Feb. 3, 1976	Oct. 19, 1976
B 557,299	3,990,357	Feb. 3, 1976	Nov. 9, 1976	B 579,806	3,995,318	Feb. 3, 1976	Nov. 30, 1976
B 557,621	3,990,800	Feb. 3, 1976	Nov. 9, 1976	B 580,379	4,000,796	Apr. 6, 1976	Jan. 4, 1977
B 557,856	3,991,019	Feb. 10, 1976	Nov. 9, 1976	B 580,826	3,988,391	Feb. 17, 1976	Oct. 26, 1976
B 558,220	3,990,009	Jan. 27, 1976	Nov. 2, 1976	B 580,921	3,984,054	Jan. 13, 1976	Oct. 5, 1976
B 558,251	3,981,289	Jan. 13, 1976	Sep. 21, 1976	B 581,843	4,000,562	Mar. 16, 1976	Jan. 4, 1977
B 558,813	3,989,188	Feb. 3, 1976	Nov. 2, 1976	B 583,051	3,990,714	Feb. 3, 1976	Nov. 9, 1976
B 558,818	3,983,762	Jan. 13, 1976	Oct. 5, 1976	B 583,089	3,982,174	Jan. 27, 1976	Sep. 21, 1976
B 558,819	3,990,160	Feb. 3, 1976	Nov. 9, 1976	B 583,712	3,995,064	Feb. 10, 1976	Nov. 30, 1976
B 558,973	3,981,126	Feb. 10, 1976	Sep. 21, 1976	B 584,520	3,981,149	Jan. 27, 1976	Sep. 21, 1976
B 559,111	3,984,854	Feb. 24, 1976	Oct. 5, 1976	B 584,997	4,000,030	Mar. 9, 1976	Dec. 28, 1976
B 559,142	4,001,124	Mar. 2, 1976	Jan. 4, 1977	B 585,247	3,989,914	Feb. 3, 1976	Nov. 2, 1976
B 559,697	3,995,770	Mar. 16, 1976	Dec. 7, 1976	B 585,731	3,993,603	Feb. 3, 1976	Nov. 23, 1976
B 559,700	4,001,189	Mar. 23, 1976	Jan. 4, 1977	B 586,215	3,985,302	Jan. 20, 1976	Oct. 12, 1976
B 559,701	4,001,190	Mar. 23, 1976	Jan. 4, 1977	B 586,380	3,983,885	Mar. 2, 1976	Oct. 5, 1976
B 559,737	3,984,668	Jan. 20, 1976	Oct. 5, 1976	B 586,387	3,981,311	Feb. 3, 1976	Sep. 21, 1976
B 559,954	3,982,673	Feb. 3, 1976	Sep. 28, 1976	B 586,663	3,992,080	Feb. 3, 1976	Nov. 16, 1976
B 560,261	3,987,493	Mar. 16, 1976	Oct. 19, 1976	B 587,118	Re. 29,067	Mar. 2, 1976	Dec. 7, 1976
B 560,488	3,989,940	Mar. 16, 1976	Nov. 2, 1976	B 587,786	3,991,204	Feb. 17, 1976	Nov. 9, 1976
B 560,717	3,982,034	Feb. 10, 1976	Sep. 21, 1976	B 587,936	3,999,052	Mar. 23, 1976	Dec. 21, 1976
B 560,765	3,983,389	Feb. 3, 1976	Sep. 28, 1976	B 589,179	4,001,102	Mar. 23, 1976	Jan. 4, 1977
B 561,062	D 242,248	Feb. 10, 1976	Nov. 9, 1976	B 589,687	3,995,349	Mar. 23, 1976	Dec. 7, 1976
B 561,365	4,005,078	Apr. 13, 1976	Jan. 25, 1977	B 589,966	3,985,828	Feb. 17, 1976	Oct. 12, 1976
B 561,387	3,985,706	Feb. 10, 1976	Oct. 12, 1976	B 590,158	3,985,163	Feb. 10, 1976	Oct. 12, 1976
B 561,405	4,003,770	Mar. 30, 1976	Jan. 18, 1977	B 590,159	3,985,164	Feb. 3, 1976	Oct. 12, 1976
B 561,712	3,992,126	Feb. 17, 1976	Nov. 16, 1976	B 590,502	4,001,171	Mar. 23, 1976	Jan. 4, 1977
B 561,732	3,991,460	Feb. 3, 1976	Nov. 16, 1976	B 592,143	3,984,713	Jan. 27, 1976	Oct. 5, 1976
B 561,764	3,984,634	Jan. 27, 1976	Oct. 5, 1976	B 592,146	4,001,084	Mar. 2, 1976	Jan. 4, 1977
B 561,770	4,000,366	Mar. 16, 1976	Dec. 28, 1976	B 592,658	4,001,164	Mar. 23, 1976	Jan. 4, 1977
B 561,784	3,984,710	Jan. 27, 1976	Oct. 5, 1976	B 594,871	3,999,245	Mar. 16, 1976	Dec. 28, 1976
B 562,413	4,000,930	Mar. 16, 1976	Jan. 4, 1977	B 596,692	3,992,349	Feb. 17, 1976	Nov. 16, 1976
B 562,462	3,985,836	Jan. 13, 1976	Oct. 12, 1976	B 597,410	4,000,925	Mar. 30, 1976	Jan. 4, 1977
B 562,601	3,998,360	Mar. 16, 1976	Dec. 21, 1976	B 657,438	3,985,701	Jan. 20, 1976	Oct. 12, 1976
B 562,698	3,983,972	Jan. 13, 1976	Oct. 5, 1976	B 747,785	3,981,899	Feb. 10, 1976	Sep. 21, 1976
B 562,813	3,985,491	Feb. 3, 1976	Oct. 12, 1976	B 843,038	3,981,785	Feb. 3, 1976	Sep. 21, 1976
B 563,070	3,996,230	Mar. 9, 1976	Dec. 7, 1976	B 845,044	4,001,338	Mar. 30, 1976	Jan. 4, 1977

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 848,336	3,993,752	Mar. 30, 1976	Nov. 23, 1976				

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 25TH DAY OF JANUARY, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

American Radionic Co., Inc.: *See*—
Stockman, Robert Michael, Re. 29,126.
Christie, Craig Eugene: *See*—
Malm, Donald Irwin; Christie, Craig Eugene; and Rojohn, Claire Eugene, Re. 29,123.
Deere & Company: *See*—
Hook, Richard Wayne; and Jackson, William Wayne, Re. 29,121.
Hook, Richard Wayne; and Zaun, Richard David, Re. 29,122.
Malm, Donald Irwin; Christie, Craig Eugene; and Rojohn, Claire Eugene, Re. 29,123.
Hook, Richard Wayne; and Jackson, William Wayne, to Deere & Company. Storage tank and recleaning apparatus for root crop harvesters. Re. 29,121, Cl. 171-58.000.
Hook, Richard Wayne; and Zaun, Richard David, to Deere & Company. Root crop harvester. Re. 29,122, Cl. 171-58.000.
Hudson, Frederick W., to Xerox Corporation. Sheet transport system. Re. 29,124, Cl. 355-3.00R.
International Shoe Machine Corporation: *See*—
Vornberger, Walter, Re. 29,120.
Jackson, William Wayne: *See*—
Hook, Richard Wayne; and Jackson, William Wayne, Re. 29,121.
Kornylak, Andrew T.; and Tabler, Charles P., to Kornylak Corporation. Continuous molding conveyor with side clamping and release. Re. 29,125, Cl. 425-115.000.
Kornylak Corporation: *See*—
Kornylak, Andrew T.; and Tabler, Charles P., Re. 29,125.
Malm, Donald Irwin; Christie, Craig Eugene; and Rojohn, Claire Eugene, to Deere & Company. Vibration isolated unitary cab and control console construction for a tractor. Re. 29,123, Cl. 296-35.00R.
Rojohn, Claire Eugene: *See*—
Malm, Donald Irwin; Christie, Craig Eugene; and Rojohn, Claire Eugene, Re. 29,123.
Stockman, Robert Michael, to American Radionic Co., Inc. Wound capacitor. Re. 29,126, Cl. 317-260.000.
Tabler, Charles P.: *See*—
Kornylak, Andrew T.; and Tabler, Charles P., Re. 29,125.
Vornberger, Walter, to International Shoe Machine Corporation. Cement lasting the side and heel portions of a shoe assembly. Re. 29,120, Cl. 12-145.000.
Xerox Corporation: *See*—
Hudson, Frederick W., Re. 29,124.
Zaun, Richard David: *See*—
Hook, Richard Wayne; and Zaun, Richard David, Re. 29,122.

LIST OF PLANT PATENTEES

Bailey, Dorothy Jean Searles, to San Joaquin Rose Co. Rose plant. 4,011, 1-25-77, Cl. 3.000.
Bailey, Dorothy Jean Searles, to San Joaquin Rose Co. Rose plant. 4,012, 1-25-77, Cl. 11.000.
San Joaquin Rose Co.: *See*—
Bailey, Dorothy Jean Searles, 4,011.
Bailey, Dorothy Jean Searles, 4,012.

LIST OF DESIGN PATENTEES

A-DEC, Inc.: *See*—
Meyer, Robert H., 243,188.
AAI Corporation: *See*—
Sofinowski, Jacob, III, 243,174.
Abrahamsen, Thomas C.: *See*—
Clayton, Richard G.; Sims, Jerry J.; McCauley, Gilbert L.; and Abrahamsen, Thomas C., 243,192.
Clayton, Richard G.; Abrahamsen, Thomas C.; Beduhn, Jack K.; and Guetschoff, Norman P., Jr, 243,193.
AFA Corporation, The: *See*—
Federico, Joseph Benedict; Wesner, Walter Herbert; and Cary, John Richard, 243,180.
Aktiebolaget Svenska Flaktfabriken: *See*—
Knutsson, Filip; and Bergstrom, Lars, 243,190.
Amerace Corporation: *See*—
Dieme, Hilmar K., 243,154.
May, Joseph R.; and Morgan, Donald F., 243,170.
American Can Company: *See*—
Bitner, John M., 243,173.
American Standard, Inc.: *See*—
Stairs, Henry M., Jr., 243,181.
Basseches, Jack, to I.C.M. Industria e Comercio de Malhas Ltda. Briefs. 243,126, 1-25-77, Cl. D2-1.000.
Beduhn, Jack K.: *See*—
Clayton, Richard G.; Abrahamsen, Thomas C.; Beduhn, Jack K.; and Guetschoff, Norman P., Jr, 243,193.
Bengt Petersson New Products Investment AB: *See*—
Magnusson, Alf B., 243,195.
Bennington, William E. Dental floss dispenser. 243,187, 1-25-77, Cl. D24-1.00D.
Bergstrom, Lars: *See*—
Knutsson, Filip; and Bergstrom, Lars, 243,190.
Berntsen, Peter; and Peterson, Phillip R. Survey monument base. 243,159, 1-25-77, Cl. D10-66.0CC.
Bieganski, Zdzislaw. Wire stripping tool. 243,149, 1-25-77, Cl. D8-61.000.
Bitner, John M., to American Can Company. Pencil sharpener. 243,173, 1-25-77, Cl. D19-74.000.
Bolwell, Edward J., to Topps-All Products of Yonkers, Inc. Form for filling bags. 243,158, 1-25-77, Cl. D9-294.000.
Bonnett, Richard L. Plastic drum. 243,155, 1-25-77, Cl. D9-170.000.
Bouche, Raymond R. Cable vibration damper. 243,151, 1-25-77, Cl. D8-230.000.
Brown, Jerry A. Combined shelves and towel rack. 243,137, 1-25-77, Cl. D6-136.000.
Bruner, James W., Sr.; and Sisk, George W., Jr., to Whirlpool Corporation. Air conditioner housing for mounting in double-hung windows. 243,186, 1-25-77, Cl. D23-141.000.
Bud, Hans. Linear distance measuring computer. 243,160, 1-25-77, Cl. D10-70.000.
Burroughs Corporation: *See*—
Clayton, Richard G.; Sims, Jerry J.; McCauley, Gilbert L.; and Abrahamsen, Thomas C., 243,192.
Clayton, Richard G.; Abrahamsen, Thomas C.; Beduhn, Jack K.; and Guetschoff, Norman P., Jr, 243,193.
Canadian Cycle & Motor Company Limited: *See*—
Farquharson, Charles R., 243,127.
Carver, Robert Glynn. Fishing lure. 243,175, 1-25-77, Cl. D22-27.000.
Carver, Robert Glynn; and Welle, Glen R. Fishing lure. 243,176, 1-25-77, Cl. D22-27.000.
Cary, John Richard: *See*—
Federico, Joseph Benedict; Wesner, Walter Herbert; and Cary, John Richard, 243,180.
Cerola, Joseph J.: *See*—
Jenn, Louis J.; Field, Thomas R.; and Cerola, Joseph J., 243,144.
Chmela, John F. Combined coaster and ash tray. 243,142, 1-25-77, Cl. D7-45.000.
Clayton, Richard G.; Sims, Jerry J.; McCauley, Gilbert L.; and Abrahamsen, Thomas C., to Burroughs Corporation. Encoder console with removable desk top. 243,192, 1-25-77, Cl. D26-5.00C.
Clayton, Richard G.; Abrahamsen, Thomas C.; Beduhn, Jack K.; and Guetschoff, Norman P., Jr, to Burroughs Corporation. Data entry key station. 243,193, 1-25-77, Cl. D26-5.00C.

Coon, Herb, to Red Wing Products, Inc. Garment hanger. 243,138, 1-25-77, Cl. D6-253.000.

Davis, Charley Winfield, Jr. Combined hinge unit, seat and seat cover for a water closet. 243,183, 1-25-77, Cl. D23-71.000.

de Massacre, Guy. Ornamental design for a boot. 243,130, 1-25-77, Cl. D2-272.000.

DFK Inc.: *See*—
Kammeraad, James A., 243,177.

Dieme, Hilmar K., to Amerace Corporation. Threaded fasteners. 243,154, 1-25-77, Cl. D8-267.000.

Downey, James A. Chair. 243,134, 1-25-77, Cl. D6-12.000.

Dunlop Limited: *See*—
Hart, Claude Albert; Holmes, Brian Howard; and Gebert, Karl, 243,168.

Dykes, James R. Lock cover. 243,150, 1-25-77, Cl. D8-137.000.

Ekuan, Kenji: *See*—
Suzuki, Toshiyuki; and Ekuan, Kenji, 243,169.

Farquharson, Charles R., to Canadian Cycle & Motor Company Limited. Mouth guard for a sports helmet. 243,127, 1-25-77, Cl. D2-233.000.

Federico, Joseph Benedict; Wesner, Walter Herbert; and Cary, John Richard, to AFA Corporation, The. Hand sprayer. 243,180, 1-25-77, Cl. D23-17.000.

Fentules, Charles S. Toothbrush container. 243,156, 1-25-77, Cl. D9-216.000.

Field, Thomas R.: *See*—
Jenn, Louis J.; Field, Thomas R.; and Cerola, Joseph J., 243,144.

Foster, Carolyn Blanche. Jewelry cabinet. 243,136, 1-25-77, Cl. D6-127.000.

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590	4,004,342
596	4,004,343
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CLASS 33

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33	4,004,350
52	4,004,351
233	4,004,352

CLASS 35

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48 R	4,004,354

CLASS 36

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63	4,004,358
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CLASS 40

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106.1	4,004,360
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CLASS 42

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CLASS 43

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58	4,004,894

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352	4,004,371
404	4,004,372
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64	4,004,382
154	4,004,383
188	4,004,384
259	4,004,385
300	4,004,386
309.3	4,004,387
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	4,004,389
436	4,004,392
484	4,004,390
584	4,004,391
637	4,004,393
741	4,004,394

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29	4,004,397
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180 M	4,004,399
182 R	4,004,400
374	4,004,401

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44	4,004,402
71	4,004,403

CLASS 55

96	4,004,897
267	4,004,898
499	4,004,899

CLASS 56

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CLASS 57

140 BY	4,004,405
140 R	4,004,406

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38 R	4,004,408
	4,004,409
90 R	4,004,410
116 M	4,004,411

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39.46 M	4,004,413
39.65	4,004,414
214	4,004,415
264	4,004,416
363	4,004,417
422	4,004,418
445	4,004,419
464	4,004,420
516	4,004,421
533	4,004,422
	4,004,423
562	4,004,425
646	4,004,424
659	4,004,426
698	4,004,427

CLASS 61

36 C	4,004,428
86	4,004,429

CLASS 62

18	4,004,430
228	4,004,431
262	4,004,432

CLASS 64

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17 R	4,004,434
32 R	4,004,435
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CLASS 65

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114	4,004,901
134	4,004,902
135	4,004,903
158	4,004,904
159	4,004,905
239	4,004,906

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132 R	4,004,438
154 A	4,004,439

CLASS 70

15	4,004,440

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79	4,004,908
	4,004,909
	4,004,910
88	4,004,911
90	4,004,912
	4,004,913
100	4,004,914
106	4,004,915

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75	4,004,441
214	4,004,442
253 R	4,004,443
370	4,004,444
389	4,004,445
400	4,004,446
414	4,004,447
462	4,004,448

CLASS 73

12	4,004,449
	4,004,450
23	4,004,451
	4,004,452
61.1 R	4,004,453
67.8 R	4,004,454
67.9	4,004,455
71.4	4,004,456
94	4,004,457
141 R	4,004,458
144	4,004,459
178 R	4,004,460
194 A	4,004,461
362 R	4,004,462
425.4 R	4,004,463
462	4,004,464

CLASS 74

84 R	4,004,465
229	4,004,466
233	4,004,467
594.4	4,004,468
604	4,004,469
661	4,004,470
713	4,004,472
714	4,004,471
759	4,004,473
801	4,004,474

CLASS 75

3	4,004,916
.5 AA	4,004,917
11	4,004,918
53	4,004,919
60	4,004,920
77	4,004,921
123 AA	4,004,922

CLASS 81

57.14	4,004,475
177 A	4,004,476

CLASS 83

23	4,004,477
331	4,004,478
345	4,004,479
530	4,004,480
555	4,004,481

CLASS 84

207	4,004,485
455	4,004,482

CLASS 85

10 E	4,004,483
37	4,004,484
64	4,004,486

CLASS 89

1.815	4,004,487
27 A	4,004,488
33 D	4,004,490
33 SF	4,004,489
35 A	4,004,492
35 R	4,004,491
36 A	4,004,493
36 L	4,004,494
42 B	4,004,495
129 B	4,004,496

CLASS 91

36	4,004,497
476	4,004,498

CLASS 92

257	4,004,499

CLASS 93

1.1	4,004,500

CLASS 96

27 R	4,004,923
35	4,004,924
38	4,004,925
66 R	4,004,926
67	4,004,927
84 UV	4,004,928
100	4,004,929

CLASS 99

426	4,004,501
593	4,004,502

CLASS 101

9	4,004,503
93.03	4,004,504
93.42	4,004,507
93.48	4,004,505
110	4,004,506
114	4,004,508
216	4,004,509
228	4,004,510
334	4,004,511
410	4,004,512
426	4,004,513

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24 HC	4,004,515
24 R	4,004,516
65	4,004,517
67	4,004,518
70.2 G	4,004,519
78	4,004,520
80	4,004,521
95	4,004,522
103	4,004,523

CLASS 104

2	4,004,524

CLASS 105

197 DH	4,004,525

CLASS 106

19	4,004,930
30	4,004,931
31	4,004,932
40 R	4,004,933
44	4,004,934
48	4,004,935
53	4,004,936
59	4,004,937
100	4,004,938
135	4,004,939
308 M	4,004,940

CLASS 108

114	4,004,526

CLASS 112

121.14	4,004,527
218 R	4,004,528

CLASS 113

5R	4,004,529
121 C	4,004,530

CLASS 114

16 E	4,004,533
74 A	4,004,535
144 R	4,004,536
	4,004,537
201 R	4,004,538
221 R	4,004,539
244	4,004,540
256	4,004,531
	4,004,532
274	4,004,534

CLASS 115

12 R	4,004,541
14	4,004,542
24	4,004,543
50	4,004,544

CLASS 116

63 P	4,004,545
129 L	4,004,546
148	4,004,547

CLASS 118

58	4,004,548
60	4,004,549
314	4,004,550

CLASS 119

5	4,004,551
43	4,004,552

CLASS 122

26	4,004,553

CLASS 123

3	4,004,554
8.05	4,004,555
8.45	4,004,556
65 VC	4,004,557
90.35	4,004,558
119 A	4,004,559
148 CB	4,004,561
148 E	4,004,560
1e9 MG	4,004,562
191 S	4,004,563

CLASS 124

35 A	4,004,564
45	4,004,565
59	4,004,566
61	4,004,567

CLASS 125

11 TP	4,004,568
26	4,004,569

CLASS 126

214 B	4,004,570
270	4,004,571
	4,004,572
271	4,004,573
	4,004,574

CLASS 128

2 F	4,004,575
2.05 F	4,004,576
2.06 E	4,004,578
2.06 R	4,004,577
28	4,004,579
32	4,004,580
92 E	4,004,581
130	4,004,582
134	4,004,583
140 N	4,004,584
145.8	4,004,585
214 D	4,004,586
214 R	4,004,587
241	4,004,588
245	4,004,589
276	4,004,590
294	4,004,591
330	4,004,592

CLASS 131

21 R	4,004,593
135	4,004,594

CLASS 132

37 R	4,004,596
40	4,004,595
84 A	4,004,597
92 R	4,004,599

CLASS 133

1 R	4,004,598

CLASS 134

15	4,004,941
25 R	4,004,942
57 D	4,004,600

CLASS 136

201	4,004,948

CLASS 137

77	4,004,601
99	4,004,602
107	4,004,603
183	4,004,604
219	4,004,605
271	4,004,606
486	4,004,607
510	4,004,608
512.15	4,004,609
614	4,004,611
614.17	4,004,610
624.11	4,004,612
625.3	4,004,613

CLASS 138

89.2	4,004,614
177	4,004,615

CLASS 139

383 R	4,004,616
416	4,004,617

CLASS 140

93.2	4,004,618

CLASS 141

11	4,004,619
137	4,004,620
392	4,004,621

CLASS 144

3 D	4,004,622
193 R	4,004,623

CLASS 145

46	4,004,624

CLASS 148

1.5	4,004,949
	4,004,950
6.27	4,004,951
39	4,004,952
172	4,004,953
174	4,004,954

CLASS 150

7	4,004,625

CLASS 151

	4,004,626

CLASS 152

355	4,004,627
383	4,004,628

CLASS 156

3	4,004,955
128 R	4,004,958
331	4,004,959
	4,004,960
421	4,004,961
475	4,004,962
583	4,004,963
643	4,004,957
666	4,004,956

CLASS 159

17 C	4,004,964
27 R	4,004,965

CLASS 160

90	4,004,629

CLASS 162

30 R	4,004,966
65	4,004,967
304	4,004,968
352	4,004,969

CLASS 164

57	4,004,630
250	4,004,631
297	4,004,632

CLASS 165

9.1	4,004,633
155	4,004,634

CLASS 166

.6	4,004,635
272	4,004,636
273	4,004,637
	4,004,638
292	4,004,639

CLASS 171

58	Re.29,121
	Re.29,122

CLASS 172

710	4,004,640
781	4,004,641

CLASS 174

37	4,005,253
110 PM	4,005,254
126 CP	4,005,255

CLASS 175

4.5	4,004,642
321	4,004,643
364	4,004,644
373	4,004,645

CLASS 176

16	4,004,970
37	4,004,971
81	4,004,972
84	4,004,973

CLASS 177

1	4,004,646
128	4,004,647

CLASS 178

34	4,005,264
69.1	4,005,266

CLASS 179

1 J	4,005,267
	4,005,268
2 C	4,005,269
6 E	4,005,270
6 R	4,005,271
15 AQ	4,005,272
15 BL	4,005,273
15.55 R	4,005,274
100.3 G	4,005,275
170.2	4,005,276
	4,005,277
181 R	4,005,278
189 D	4,005,279

CLASS 180

14 R	4,004,648

CLASS 181

36 C	4,004,649
42	4,004,650
117	4,004,651

CLASS 182

118	4,004,652
128	4,004,653

CLASS 187

16	4,004,654
52 R	4,004,655

CLASS 188

52	4,004,656
71.3	4,004,657
73.5	4,004,658
218 XL	4,004,661
244	4,004,659
271	4,004,660
284	4,004,662
332	4,004,663

CLASS 190

49	4,004,664

CLASS 192

4 A	4,004,665
44	4,004,666
56 R	4,004,667
58 B	4,004,668
70.17	4,004,669
105 A	4,004,670

CLASS 195

1.3	4,004,974
1.8	4,004,975
2	4,004,976
31 P	4,004,977
51 R	4,004,978
68	4,004,979
	4,004,980
127	4,004,981

CLASS 197

1 R	4,004,671
	4,004,672
	4,004,673
	4,004,674
176	4,004,675

CLASS 198

326	4,004,676
452	4,004,677
460	4,004,678
509	4,004,679
732	4,004,680
796	4,004,681
852	4,004,682

CLASS 200

5 A	4,005,293
19 A	4,005,294
61.62	4,005,295
85 R	4,005,296
144 B	4,005,297
153 R	4,005,298
159 B	4,005,299
296	4,005,300

CLASS 201

29	4,004,982

CLASS 202

142	4,004,983
173	4,004,984
230	4,004,985
254	4,004,986

CLASS 204

1.5	4,004,987
95	4,004,988
99	4,004,989
113	4,004,990
119	4,004,991
129.55	4,004,992
131	4,004,993
149	4,004,994
157.1 H	4,004,995
158 HA	4,004,996
159.14	4,004,997
159.22	4,004,998
181	4,004,999
	4,005,000
195 P	4,005,002
195 S	4,005,001
290 F	4,005,003
	4,005,004

CLASS 206

3	4,004,683
	4,004,684
.5	4,004,685
104	4,004,686
233	4,004,687
330	4,004,688
387	4,004,689
425	4,004,690
459	4,004,691
486	4,004,692

CLASS 208

11 LE	4,005,005
89	4,005,006
111	4,005,007

CLASS 209

81 R	4,004,693
111.7 R	4,004,694
223 R	4,005,008

CLASS 210

17	4,005,010
18	4,005,011
23 H	4,005,012
44	4,005,009
106	4,005,013
192	4,005,014
220	4,005,015
268	4,005,016
284	4,005,017
386	4,005,018
525	4,005,019

CLASS 212

49	4,004,696
144	4,004,695

CLASS 213

75 R	4,004,697

CLASS 214

1 BB	4,004,698
6 C	4,004,699
15 D	4,004,700
16.4 A	4,004,701
35 R	4,004,702
82	4,004,703

CLASS 215

220	4,004,704
246	4,004,705

CLASS 217

2 J	4,005,339

CLASS 219

10.55 A	4,005,301
10.61	4,005,302
69 C	4,005,303
69 D	4,005,304
72	4,005,305
76	4,005,306
109	4,005,307
125 R	4,005,308
146	4,005,309
227	4,005,310

CLASS 220

3	4,004,706
22	4,004,707
224	4,004,708
257	4,004,709
306	4,004,710

CLASS 221

63	4,004,711
150 A	4,004,712
211	4,004,713

CLASS 222

30	4,004,715
41	4,004,714
145	4,004,716
255	4,004,717
366	4,004,719
386	4,004,718

CLASS 223

57	4,004,720
89	4,004,721

CLASS 224

45 P	4,004,722

CLASS 225

103	4,004,723

CLASS 226

91	4,004,724

CLASS 228

49	4,004,725
173	4,004,726

CLASS 229

4.5	4,004,727
76	4,004,728

CLASS 235

61.11 R	4,005,280
61.5 S	4,004,729
151.3	4,005,281
	4,005,282
194	4,005,283
	4,005,284

CLASS 236

14	4,004,730

CLASS 237

51	4,004,731

CLASS 239

2 S	4,004,732
3	4,004,733
58	4,004,734
79	4,004,735
102	4,004,736
	4,004,737

CLASS 241

29	4,004,738
34	4,004,739
52	4,004,740
55	4,004,741
82.5	4,004,742

CLASS 242

7.03	4,004,743
25 R	4,004,744
54 R	4,004,745
55.19 A	4,004,746
56.5	4,004,747
62	4,004,748
75.4	4,004,749
75.43	4,004,750
107.4 A	4,004,751
198	4,004,752

CLASS 243

19	4,004,753

CLASS 244

3.16	4,004,754
12.5	4,004,755
17.13	4,004,756
	4,004,757
	4,004,758
17.17	4,004,759
53 B	4,004,760
100 A	4,004,761
104 FP	4,004,762
122 R	4,004,763
149	4,004,764

CLASS 246

118	4,004,765

CLASS 248

55	4,004,766
58	4,004,767
59	4,004,768
188.1	4,004,769
323	4,004,770
357	4,004,771
430	4,004,772

CLASS 249

93	4,004,773
114	4,004,774

CLASS 250

208	4,005,285
216	4,005,286
239	4,005,287
	4,005,288
253	4,005,289
266	4,005,290
282	4,005,291
364	4,005,292
445 T	4,005,311
527	4,005,135
551	4,005,312

CLASS 251

310	4,004,775
315	4,004,776

CLASS 252

8.55 B	4,005,020
51.5 A	4,005,021
62.1 L	4,005,022
78.3	4,005,023
89 B	4,005,026
89 R	4,005,024
	4,005,025
95	4,005,027
99	4,005,028
	4,005,029
140	4,005,030
186	4,005,031
299	4,005,032
301.1 R	4,005,042
356	4,005,043
358	4,005,044
373	4,005,045
428	4,005,046
429 R	4,005,047
432	4,005,048
467	4,005,049
521	4,005,050

CLASS 254

51	4,004,777
142	4,004,778
187.4	4,004,779
	4,004,780

CLASS 256

10	4,004,781

CLASS 259

3	4,004,782
72	4,004,783
	4,004,784
104	4,004,785
107	4,004,786
191	4,004,788
192	4,004,787

CLASS 260

2.5 AJ	4,005,034
2.5 AK	4,005,035
2.5 B	4,005,033
2.5 F	4,005,036
4 AR	4,005,037
17 R	4,005,038
17.3	4,005,039
17.4 GC	4,005,040
18 TN	4,005,041
29.4 R	4,005,051
29.6 TA	4,005,052
33.6 AQ	4,005,053
42.56	4,005,054
47 UA	4,005,055
77.5 CH	4,005,056
78 S	4,005,057
78.41	4,005,058
97.7	4,005,060
112 R	4,005,062
112.5 LH	4,005,063
143	4,005,064
145 A	4,005,065
	4,005,066
151	4,005,067
156	4,005,069
157	4,005,068
239 BF	4,005,071
239 E	4,005,072
239.1	4,005,073
	4,005,074
	4,005,075
239.3 P	4,005,076
	4,005,077
239.5	4,005,078
239.55 D	4,005,079
240 F	4,005,080
243 C	4,005,081
244 R	4,005,082
247.1 P	4,005,084
247.2 A	4,005,086
247.2 B	4,005,085
248 C	4,005,087
284	4,005,088
285.5	4,005,089
	4,005,090
286 R	4,005,091
287 P	4,005,092
293.62	4,005,093
293.66	4,005,094
293.68	4,005,095
294.9	4,005,096
295 Q	4,005,097
308 A	4,005,098
309	4,005,099
310 R	4,005,100
326 N	4,005,102
326.5 CA	4,005,103
327 B	4,005,105
327 H	4,005,104
340.9	4,005,106
343.2 R	4,005,107
343.3 R	4,005,108
	4,005,109
	4,005,110
345.2	4,005,111
346.1 R	4,005,112
	4,005,113
348.5 L	4,005,114
410.9 R	4,005,115
448.2 N	4,005,116
448.8 R	4,005,117
	4,005,118
	4,005,119
462 R	4,005,120
463	4,005,121
468 G	4,005,122
470	4,005,123
475 R	4,005,124
476 R	4,005,125
	4,005,126
479 R	4,005,127
485 R	4,005,128
	4,005,129
	4,005,130
	4,005,131
501.11	4,005,133
502.3	4,005,132
520 E	4,005,134
535 P	4,005,136
539 R	4,005,137
543 F	4,005,138
553 A	4,005,140
556 F	4,005,141
571	4,005,142
575	4,005,143
578	4,005,144
586 R	4,005,145
	4,005,146
593 R	4,005,147
607 AR	4,005,148
609 R	4,005,149
613 D	4,005,150
623 R	4,005,151
648 R	4,005,152
650 R	4,005,153
837 R	4,005,154
851	4,005,155
880 R	4,005,156
897 C	4,005,157
949	4,005,158
953	4,005,159
970	4,005,160

CLASS 261

44 R	4,005,161

CLASS 264

25	4,005,162
81	4,005,163
97	4,005,164
103	4,005,168
	4,005,169
117	4,005,170
135	4,005,165
154	4,005,166
318	4,005,101
329	4,005,167

CLASS 266

87	4,004,789
193	4,004,790
197	4,004,791
218	4,004,792
236	4,004,793

CLASS 267

153	4,004,794

CLASS 271

10	4,004,795
94	4,004,796
136	4,004,797
172	4,004,798
174	4,004,802

CLASS 272

8 N	4,004,799
101	4,004,800
120	4,004,801

CLASS 273

1 R	4,004,803
5 R	4,004,804
29 R	4,004,805
	4,004,806
41	4,004,807
108	4,004,808
134 C	4,004,809
134 GM	4,004,810
135 D	4,004,811
137 C	4,004,812
139	4,004,813
204	4,004,814

CLASS 274

1 A	4,004,815
10 R	4,004,816
23 R	4,004,817

CLASS 280

11.37 H	4,004,818
79.3	4,004,819
103	4,004,820
415 A	4,004,822
615	4,004,823
636	4,004,824
654	4,004,825
718	4,004,826
742	4,004,827
743	4,004,828
744	4,004,821
745	4,004,829
763	4,004,830

CLASS 285

81 4,004,831
333 4,004,832

CLASS 292

288 4,004,833

CLASS 294

19 R 4,004,834
86.29 4,004,835

CLASS 296

35 R Re.29,123

CLASS 297

354 4,004,836

CLASS 301

37 P 4,004,837
105 R 4,004,838

CLASS 303

6 C 4,004,839

CLASS 307

10 R 4,005,313
110 4,005,314
209 4,005,315
247 A 4,005,316
253 4,005,317
304 4,005,318

CLASS 308

201 4,004,840

CLASS 310

8.3 4,005,319
9.1 4,005,321
40 MM 4,005,320

CLASS 312

342 4,004,841

CLASS 313

60 4,005,322
105 CM 4,005,323
222 4,005,324
352 4,005,325
357 4,005,326
367 4,005,327
487 4,005,328

CLASS 315

3.5 4,005,329
57 4,005,330
92 4,005,331
112 4,005,332
173 4,005,333
208 4,005,334
224 4,005,335
239 4,005,336
241 S 4,005,337
362 4,005,338

CLASS 316

1 4,004,842

CLASS 317

11 A 4,005,340
15 4,005,341
16 4,005,342
31 4,005,344
96 4,005,343
103 4,005,345
260 Re.29,126

CLASS 318

128 4,005,346
254 4,005,347
373 4,005,348
569 4,005,349

CLASS 321

11 4,005,350
14 4,005,351
19 4,005,352

CLASS 323

22 R 4,005,353
51 4,005,354

CLASS 324

.5 F 4,005,355
15 4,005,356
32 4,005,357
34 R 4,005,358
34 TK 4,005,359
4,005,360
51 4,005,361
4,005,362
58.5 B 4,005,363
79 D 4,005,364
133 4,005,365

CLASS 325

67 4,005,366
352 4,005,367
455 4,005,368
4,005,369

CLASS 328

267 4,005,370

CLASS 330

30 D 4,005,371
34 4,005,372
51 4,005,373

CLASS 331

94.5 PE 4,005,374

CLASS 333

6 4,005,379
21 R 4,005,375
30 R 4,005,376
70 T 4,005,377
72 4,005,378

CLASS 336

84 4,005,380

CLASS 338

119 4,005,381

CLASS 339

108 TP 4,004,843
118 R 4,004,844
258 P 4,004,845
263 R 4,004,846

CLASS 340

1 R 4,005,382
3 R 4,005,383
15 4,005,384
52 C 4,005,401
146.1 AL 4,005,405
146.3 AE 4,005,385
172.5 4,005,386
4,005,387
4,005,388
4,005,389
4,005,390
4,005,391
4,005,392
173 DR 4,005,395
173 FF 4,005,393
173 LM 4,005,394
196 4,005,396
223 4,005,397
279 4,005,398
310 R 4,005,399
324 M 4,005,402
336 4,005,403
4,005,404
347 AD 4,005,407
4,005,410
347 C 4,005,409
347 DA 4,005,406
347 DD 4,005,411
347 P 4,005,408
365 R 4,005,400
380 4,005,412
402 4,005,413

CLASS 343

5 SA 4,005,414
4,005,417
5 VQ 4,005,415
4,005,416
6.8 R 4,005,418
7.4 4,005,419
7.5 4,005,420
16 M 4,005,421
17.1 R 4,005,422
17.2 PC 4,005,423
17.7 4,005,424
4,005,425
100 LE 4,005,426
106 D 4,005,427
228 4,005,428
713 4,005,429
747 4,005,430
771 4,005,431
792.5 4,005,432
819 4,005,433

CLASS 346

1 4,005,434
4,005,435
74.1 4,005,439
140 A 4,005,440
153 4,005,436
158 4,005,438
165 4,005,437

CLASS 350

160 LC 4,004,848
160 R 4,004,849
161 W 4,004,847
299 4,004,850
311 4,004,851

CLASS 354

23 R 4,005,441
25 4,005,442
4,005,443
27 4,005,444
30 4,005,448
44 4,005,445
86 4,005,446
128 4,005,449
155 4,005,458
156 4,005,459
166 4,005,447
202 4,005,460
204 4,005,461
246 4,005,462
307 4,005,463
322 4,005,464

CLASS 355

3 R Re.29,124

CLASS 356

1 4,004,852
226 4,004,853

CLASS 357

6 4,005,465
14 4,005,466
15 4,005,468
4,005,469
22 4,005,467
23 4,005,450
35 4,005,451
36 4,005,470
49 4,005,452
4,005,453
51 4,005,471
65 4,005,454
71 4,005,455
4,005,456
4,005,472
72 4,005,457

CLASS 358

4 4,005,473
4,005,474
80 4,005,475
83 4,005,261
112 4,005,258
128 4,005,259
4,005,260
145 4,005,265
168 4,005,262
195 4,005,256
227 4,005,263
256 4,005,257

CLASS 360

36 4,005,476
40 4,005,478
51 4,005,477
4,005,479
60 4,005,480
4,005,481
66 4,005,482
69 4,005,483
74 4,005,484
75 4,005,485
79 4,005,486
94 4,005,487
4,005,488
4,005,489
97 4,005,490
105 4,005,491
4,005,492
106 4,005,493

CLASS 401

205 4,004,854

CLASS 403

158 4,004,855
186 4,004,856

CLASS 404

6 4,004,857

CLASS 408

153 4,004,858

CLASS 415

25 4,004,859

CLASS 416

2 4,004,860
41 4,004,861

CLASS 417

234 4,004,862
271 4,004,863

CLASS 418

1 4,004,864
45 4,004,865
61 B 4,004,866

CLASS 423

24 4,005,173
43 4,005,174
83 4,005,175
87 4,005,176
102 4,005,061
213.5 4,005,177
259 4,005,178
300 4,005,171
4,005,172
407 4,005,179
446 4,005,180
447.2 4,005,183
449 4,005,181
467 4,005,182
579 4,005,184
648 4,005,185
659 4,005,186

CLASS 424

1.5 4,005,187
5 4,005,188
47 4,005,189
127 4,005,190
154 4,005,191
157 4,005,192
168 4,005,193
177 4,005,194
180 4,005,195
4,005,196
216 4,005,197
227 4,005,198
228 4,005,199
243 4,005,200
245 4,005,083
248.57 4,005,201
250 4,005,202
251 4,005,203
4,005,204
4,005,205
263 4,005,206
4,005,207
267 4,005,208
4,005,209
4,005,211
270 4,005,212
4,005,213
271 4,005,214
282 4,005,216
300 4,005,217
304 4,005,218
305 4,005,219
315 4,005,220
317 4,005,221
319 4,005,222
322 4,005,223
325 4,005,224
359 4,005,210

CLASS 425

11 4,004,867
115 Re.29,125
130 4,004,868
159 4,004,869
224 4,004,870
243 4,004,871
326 B 4,004,872
335 4,004,873
438 4,004,874

CLASS 426

21 4,005,225
281 4,005,226
537 4,005,227
550 4,005,139
586 4,005,228

CLASS 427

304 4,005,229
354 4,005,230
387 4,005,231

CLASS 428

35 4,005,232
4,005,233
36 4,005,234
4,005,235
72 4,005,236
195 4,005,237
313 4,005,238
315 4,005,239
333 4,005,240
335 4,005,241
425 4,005,242
469 4,005,243
480 4,005,244
542 4,005,245

CLASS 429

17 4,004,947
59 4,004,943
72 4,004,946
94 4,005,246
215 4,004,944
244 4,004,945

CLASS 431

9 4,004,875

CLASS 432

14 4,004,876

CLASS 474

273 4,005,215

CLASS 526

15 4,005,247
20 4,005,248
60 4,005,249
204 4,005,250
259 4,005,059

CLASS 536

59 4,005,251
66 4,005,070

CLASSIFICATION OF DESIGNS

D2—	1	243,126	D7—	5	243,140		267	243,154		118	243,167		17	243,180		14 K	243,194
	233	243,127		21	243,139	D9—	170	243,155		146	243,168		55	243,181	D27—	8	243,195
		243,128		41	243,141		216	243,156		205	243,169		59	243,182		36	243,196
	260	243,129		45	243,142		255	243,157		211	243,170		71	243,183		42	243,197
	272	243,130		55	243,143		294	243,158	D15—	29	243,207		94	243,184			243,198
	361	243,131		110	243,144	D10—	66	243,159	D16—	1	243,171		127	243,185			243,199
		243,132		137	243,146		70	243,160		63	243,172		141	243,186			243,200
		243,133	D8—	30	243,147	D11—	166	243,201	D19—	74	243,173	D24—	1 B	243,188	D34—	5 SS	243,202
D6—	12	243,134		50	243,148	D12—	1	243,161	D22—	7	243,174		1 D	243,187			243,203
	95	243,135		61	243,149		2	243,162		27	243,175	D25—	84	243,189		15 AJ	243,206
	113	243,145		137	243,150		62	243,163			243,176	D26—	1 R	243,190		15 AM	243,205
	127	243,136		230	243,151		98	243,164		30	243,177		5 C	243,191		15 GG	243,204
	136	243,137		243	243,152		111	243,165		99	243,178			243,192	D56—	1 A	243,208
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	243,139	12	243,180	19	243,155		243,184		243,153		243,188
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	243,206		243,144	26	243,163	36	243,138		243,140	55	243,159

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Elliot L. Richardson, Secretary

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C. Marshall Dann, Commissioner